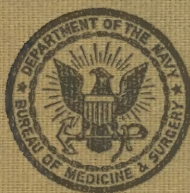


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MEDICAL COMPEND  
FOR  
COMMANDERS OF NAVAL VESSELS  
—  
TO ACCOMPANY MEDICINE BOX  
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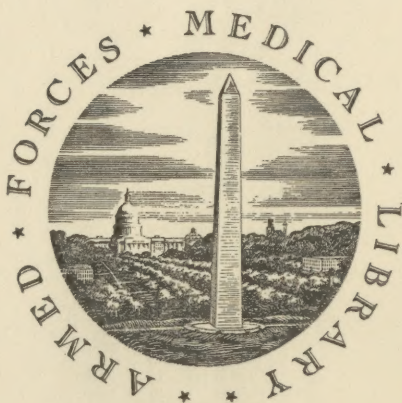


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# MEDICAL COMPEND

For

Commanders of Naval Vessels to Which  
no Member of the Medical Department  
of the United States Navy is Attached  
and Others

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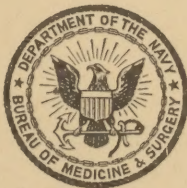
To accompany Medicine Box

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U. S. BUREAU OF MEDICINE AND SURGERY

UNDER THE AUTHORITY OF THE  
SECRETARY OF THE NAVY

(M. & S. File Number 127219)



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GOVERNMENT PRINTING OFFICE  
1923

BUREAU OF MEDICINE AND SURGERY,  
NAVY DEPARTMENT,  
*Washington, D. C., July 1, 1923.*

This Medical Compend for Commanders of Naval Vessels to which no member of the Medical Department of the United States Navy is attached is published for their aid in the knowledge and use of the contents of the medicine box, United States Navy, as well as to be a general guide in the preservation of the health of the personnel under their command.

E. R. STITT,  
*Surgeon General, United States Navy.*

Approved:

EDWIN DENBY,  
*Secretary of the Navy.*



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# MEDICAL COMPEND FOR COMMANDERS OF NAVAL VESSELS TO WHICH NO MEMBER OF THE MEDICAL DEPARTMENT OF THE UNITED STATES NAVY IS ATTACHED, AND OTHERS.

TO ACCOMPANY MEDICINE BOX.

## CHAPTER I.

### THE MEDICINE BOX.

The outfit of medicines and medical supplies furnished vessels of the Navy having no medical officer or member of the Hospital Corps consists of (a) one medicine box, Navy standard, and (b) a box of additional medical supplies in an ordinary packing case, or of (c) a boat box. The contents of these boxes, with simple directions for their use, are given below.

#### MEDICINE BOX (CONTENTS).

[Medicine case.    Tablets.    1-ounce bottles.]

Alkaline and antiseptic (Seiler's)	1	Lead and opium	1
Aspirin, 5 grains	1	Potassium chlorate, 2½ grains; so-	
Brown mixture, 1 dram	1	dium borate, 2½ grains	1
Calomel, ½ grain	1	Quinine sulphate, 3 grains	1
Cathartic, vegetable	1	Salol, 5 grains	1
Chlorodyne	1	Soda mint	1
Coryza	1	Sodium salicylate, 5 grains	1
Dover's powder, 5 grains	1	Trional, 5 grains	1
Iron, quinine, arsenic, and strychnine	1		

#### MEDICINES, DRESSINGS, ETC.

Adhesive plaster, 2 inches wide, spool	1	Catheter, soft rubber	set	1
Bag, hot-water	number	Collodion flexible	bottle	1
Bag, ice	do	Colloidal silver	do	1
Bandage, gauze, assorted	do	Cotton, absorbent	roll	1
Bandage, suspensory	do	Epsom salts	tin	1
Basin, dressing, agate	do	First-aid packet	number	6
Belladonna plaster	box	Formaldehyde solution	bottle	1
Bichloride of mercury (antiseptic tablets)	bottle	Fountain syringe	number	1
Castor oil	do	Gauze, plain, absorbent	roll	1
		Iodine tincture, 50 c.c., in bottle	bottle	1

## MEDICINES, DRESSINGS, ETC.—continued.

Ligature, silk, No. 4, threaded in needle-----tubes--	6	Pins, scissors, and dressing forceps (set in case) (contents in detail, page 68) -----set--	1
Ligature, silk, No. 8, threaded in needle-----tubes--	6	Soap liniment-----bottle--	1
Lint, absorbent-----roll--	1	Soda bicarbonate-----can--	1
Liquid extract of beef-----bottle--	1	Spatula, 3-inch -----number--	1
Medicine glass-----number--	1	Spirit of ammonia, aromatic -----bottle--	1
Muslin -----yards--	5	Syringe, penis, rubber-----number--	2
Mustard plaster-----box--	1	Thermometer, clinical -----do--	1
Ointment, aristol-----jar--	1	Tourniquet, instant-----do--	2
Ointment, sulphur-----do--	1	Vaseline -----tin--	1
Ointment, zinc oxide-----do--	1	Wire mesh for splints-----feet--	3
Pencil, hair-----number--	6	" Medical Compend "-----number--	1
Picric acid solution-----bottle--	1		

## DIRECTIONS, ETC.

Alkaline and antiseptic tablets (Seiler's). For sore throat. Dissolve one tablet in four tablespoonfuls of water and use as gargle or nasal douche.

Aspirin, 5 grains. For headache, neuralgia, and fever. Dose: One tablet, repeated in one hour if necessary.

Brown mixture tablets (1 dram). For coughs. Dose: One tablet every hour dissolved on the tongue. Limit, 20 tablets in 24 hours.

Calomel tablets, one-half grain. Cathartic in fevers. Dose: One every hour until five are taken. Should be followed in a few hours or the next morning by a dose of salts (magnesium sulphate).

Carthartic vegetable tablets. Purgative. Dose: One to three tablets.

**Poison.**—Chlorodyne tablets (contain morphine). Should be used with great care. For colic. Dose: One tablet: repeat in an hour if necessary. Stop when three tablets have been taken. For diarrhea: One tablet every three hours until four tablets have been taken.

Coryza tablets. For commencing colds in head. Dose: One tablet every 15 minutes until four tablets have been taken, then one tablet every 30 minutes for four doses, and then one every hour for four doses. Limit, 12 tablets taken as directed.

**Poison.**—Dover's powder, 5 grains (contains opium). To produce sweating. Should be used with care. Dose: Two tablets.

Iron, quinine, arsenic, and strychnine. Tonic tablets. Dose: One tablet three or four times a day.

Lead and opium. For diarrhea. Dose: One tablet.

Potassium chlorate and borax. For sore throat: Dissolve on tongue or dissolve tablet in a little water and use as a gargle. Limit, 8 to 10 tablets a day.

Quinin sulphate, 3 grains. For malarial fevers. Dose: One to three tablets every four hours. Limit, 12 tablets in 24 hours. As

many as seven tablets may be given at a dose in severe malarial fevers.

Salol. For intestinal fermentation. Dose: One to two tablets in milk or water three times a day.

Soda-mint tablets. For sour stomach and heartburn. Dose: One every two hours dissolved on the tongue.

Sodium salicylate, 5 grains. For rheumatism. Dose: Three tablets every four hours. Limit, 12 tablets in 24 hours.

Trional, 5 grains. For producing sleep. Dose: Two to three tablets in a little water half an hour before bedtime.

Belladonna plaster. Apply locally for rheumatic pains. Also see directions on box.

**Poison.**—Bichloride of mercury tablets (antiseptic). For external use only. Dissolve one tablet in a pint of distilled or boiled water and use externally as an antiseptic wash for cleaning ulcers or infected wounds. *Great care should be exercised with these tablets.* The utensils should be carefully washed after their use with the solution. The solution should never be used in metallic vessels nor on metallic instruments.

Castor oil. Cathartic. Dose: Two tablespoonfuls. Wet the mouth with hot liquid (milk, coffee, or tea) and give the oil floating in some of the liquid.

Collodion, flexible. For holding on small cotton dressings. May be applied directly to very small wounds with a hair pencil. Keep bottle securely closed to prevent evaporation.

Colloidal silver. Prepare a solution of 1 part of colloidal silver to 10 parts of water. Use as injection in gonorrhea (clap). Solutions should be prepared fresh as required and should not be used after standing for any long period of time, as the drug deteriorates rapidly in solution.

Epsom salts (magnesium sulphate). For constipation. Dose: One to two tablespoonfuls dissolved in half glass of water taken on empty stomach.

Formaldehyde solution. **Poison.** For use as disinfectant only. Should be kept well stoppered and in a cool place. The escaping vapor is very irritating to the eyes, nostrils, and lungs. Three parts of this solution to 2,000 parts of water serves as an excellent disinfectant for knives, forks, cups, etc.

**Poison.**—Iodine tincture, 4 per cent. External use only. For disinfecting wounds. Apply with hair pencil or cotton on match.

Liquid extract of beef. Dissolve two tablespoonfuls in half a pint of hot water.

Mustard plaster. Apply locally for not over 20 minutes. See directions on box.

Ointment of aristol. For painful sores and wounds. Apply spread on gauze.

Ointment, sulphur. For itch and ringworm. Rub on affected part thoroughly.

Ointment of zinc oxid. For eczema, sunburn, etc. Apply locally.

**Poison.**—Picric-acid solution, about 1 per cent. For scalds and burns. Wet strips of gauze with this solution, apply directly to burned surface, and lightly secure with bandage. Dressing should be kept moist with the solution.

Soap liniment. For external use only. For sprains, lumbago, and rheumatic pains. Apply locally with rubbing.

Sodium carbonate (baking soda). For burns. Turn top of can to open holes and sprinkle well over surface, cover with gauze, and bandage.

Spirits of ammonia, aromatic. For faintness. Dose: One-half to one teaspoonful well diluted with water.

Vaseline (petrolatum). For sunburn, chapped hands, etc. Apply locally.

Bag, hot-water. Fill to one-half its capacity with hot water. Lay the bag on its side and squeeze the bag above the water to expel the air and, after screwing in the stopper, hold the bag upside down to be sure there is no leakage. Wrap bag in a bath towel: place over desired area. *Watch carefully* to see if bag is too hot.

Bag, ice. Break the ice into small pieces. Fill the bag to three-quarters of its capacity and wrap it in a towel: never put the rubber directly upon the skin.

Bandages, gauze.

Basin, dressing, agate.

Camel's-hair pencils. For application of tincture of iodine.

Cotton, hospital. For dressings.

Dressing forceps, pins, scissors, and scalpel.

Gauze for dressings.

Ligature, silk, with needle in tube. For sewing up wounds.

Medicine glass for measuring.

Muslin, bleached. For preparation of bandages.

Packages, first-aid. Directions on package.

Penis syringes, glass. For injection of colloidal silver.

Plasters, belladonna. For rheumatic pains. Also see directions on box.

Plasters, mustard. See directions on box.

Plaster, rubber, adhesive. Two-inch spool. For holding dressings in place.

Spatula, small. For spreading ointments.

Thermometers, clinical, in case.

Tourniquets, instant, rubber. For stopping flow of blood from wounds or constricting circulation.

The additional supplies in packing case are largely supplementary, and are as follows:

## MEDICINES, ETC.

Castor oil.....	bottles...	6
Collodium flexible.....	do.....	4
Colloidal silver.....	do.....	5
Epsom salts.....	tins...	3
Formaldehyde solution.....	bottles...	2
Iodine tincture, 50 c. c. in bottle	.....	
.....	bottles...	2
Mustard plaster.....	boxes...	4
Picric-acid solution.....	bottles...	2
Soap liniment.....	do.....	2
Sodium bicarbonate.....	do.....	2
Vaseline.....	tins...	4

## TABLETS.

Alkaline and antiseptic (Seiler's)	.....	
.....	bottle...	1
Aspirin, 5 grains.....	do.....	1
Brown mixture, 1 dram.....	bottles...	2
Cathartic vegetable.....	do.....	2
Lead and opium.....	bottle...	1

## TABLETS—continued.

Quinine sulphate, 3 grains.....	.....	
.....	bottles...	3
Sodium salicylate, 5 grains.....	.....	
.....	bottle...	1

## HOSPITAL STORES.

Liquid extract of beef.....	bottles...	12
-----------------------------	------------	----

## MISCELLANEOUS.

Adhesive plaster.....	spools...	2
Bandage, gauze, assorted.....	.....	
.....	number...	36
Bandage, suspensory.....	do.....	6
Cotton, absorbent.....	rolls...	2
Gauze, plain, absorbent.....	do.....	2
Lint, absorbent.....	do.....	2
Medicine glass.....	number...	2
Syringe, penis, rubber.....	do.....	12
Thermometer, clinical.....	do.....	2
Tourniquet, instant.....	do.....	2

Supplies listed above may be procured as required by requisition Form 4 of the Bureau of Medicine and Surgery. Requisitions, when approved, will be filled by the naval medical supply depot most convenient to the ship; that is, if in Atlantic waters, by the depot in Brooklyn, N. Y.; if in Pacific waters, by the depot at Mare Island, Calif.; if in the Philippines or on the Asiatic station, by the depot at Canacao, P. I.

Advantage should be taken of opportunities when in the vicinity of a supply depot or when at navy yards or in dry dock to replenish the stock of medicines, etc.

A supply of requisition Form 4 may be secured from any supply depot, but if this form is not available request may be made by letter addressed to the Bureau of Medicine and Surgery. Requisitions should be limited to the articles listed above and should be arranged by classes and correspond in amount with packages as indicated.

## THE BOAT BOX.

Adhesive plaster, 2-inch wide	.....		Lead and opium tablets.....	bottle...	1
.....	spool...	1	Liquid extract of beef.....	bottles...	2
Bandages, gauze, assorted.....	.....		Muslin.....	yards...	2
.....	number...	8	Mustard plasters.....	box...	1
Brown mixture, tablets.....	bottle...	1	Pins, scissors, and dressing for-	.....	
Calomel tablets, $\frac{1}{2}$ -grain.....	bottle...	1	ceps (set in case).....	set...	1
Carbolated vaseline.....	jar...	1	Quinine tablets, 3-grain.....	bottle...	1
Cathartic pills.....	bottle...	1	Soda bicarbonate.....	can...	1
First-aid packets.....	number...	6	Tourniquets, instant, rubber.....	.....	
Gauze, compressed.....	packages...	6	.....	number...	4

## CHAPTER II.

---

### FIRST AID.

Do not attempt to rival the doctor, but aid him through emergency measures, and thus put the patient into his hands with a better chance of recovery than would have been the case if prompt and efficient emergency treatment had not been rendered.

In the presence of an accident the "first aider" must take charge, if the services of a doctor can not be obtained, and he should observe the following general rules:

1. Be quiet and cool, don't get excited, and do the best you can with the facilities at hand.

2. Give the patient plenty of air; keep the crowd from gathering around, many of whom will be there only for curiosity's sake. Keep only those around you whose assistance you may need.

3. Lay the patient on his back, with head lower than the body, except in cases with marked flushing of the face, when the head may be raised a little on folded clothing or other suitable material.

4. If there is vomiting, turn the head to one side so the vomited matter may easily escape from the mouth, thus eliminating the risk of its going into the windpipe and choking him.

5. If the patient is unconscious, do not try to force him to drink, for he can not swallow, and you may choke him.

6. Do not move patient from place of injury unless his condition justifies it. Often the injury will have to be attended to before it is safe to move him.

7. Loosen tight clothing which may be present around the neck, chest, abdomen, legs, and ankles, such as collar, belt, garters, and shoe lacings.

8. If stimulants are needed, whisky and brandy are not always indicated. In fact, there are conditions in which they do harm. Aromatic spirits of ammonia, if on hand, is safer for general use.

9. In order to treat the injury the part has to be exposed and the clothing in some cases has to be removed. This should be done in such a manner as to disturb the patient as little as possible. The outer clothing should be ripped up the seam: the underclothing torn or cut. The sound side should be undressed first. In removing the shoes it is often necessary to cut them off when they can not be removed otherwise without causing great pain or increasing the injury.

10. An injured person often wants a drink of water. If conscious and able to swallow, a few sips of cold water will be very refreshing.

11. If several injuries are present, care for the most severe one first.

12. *Don't put your fingers into the wound;* they carry germs, and you will infect the wound.

#### THE RESUSCITATION OF THE APPARENTLY DROWNED.

The indications in treating one apparently drowned are to remove the water from the upper air passages, to make the patient breathe, and to stimulate the weak heart.



Various methods for the production of artificial respiration have been described, but the one that is considered the best, namely, Schäfer's, will be outlined here.

· Schäfer's description of his method is in substance as follows:

*The subject, whether a drowned person or not, is allowed to lie prone, i. e., face downward, no preliminary manipulation of the tongue being required. The operator kneels or squats either across or on one side of the subject, facing the head, and places his hands close together upon the back of the subject over the loins, the fingers extending over the lowest ribs. By now leaning forward upon the hands, keeping the elbows extended, the weight of the operator's body is brought to bear upon the subject, and this not only compresses the lower part of the chest but also the belly upon the ground, the pressure being fairly equally distributed. The result of this is that not only is the chest diminished in extent from before back but owing to the pressure which is communicated to the belly the belly contents are compressed and tend to force the muscle partition between the chest and belly up, so that the chest is diminished in capacity from above down. The pressure is applied not violently but gradually during about three seconds, and is then released by the operator swinging his body back, but without removing his hands. The elasticity of the chest and belly causes these to resume their original dimensions, and air passes in through the windpipe; after two seconds the process is again commenced, and is continued in the same way, the operator swinging his body forward and backward once every five seconds, or about 12 times a minute, without any violent effort and with the least possible exertion.*

This last condition, viz, the absence of muscular exertion other than that involved in swinging forward and backward, renders it possible to continue the process without fatigue for an indefinite time. Its advantages in drowning cases over a method which involves the position on the back are sufficiently obvious, for with it there is no risk of obstruction by water or slime or the contents of the stomach. These can not accumulate in the throat, but must come away by the mouth, and the tongue, instead of falling backward, as in the position on the back, falls forward and is unable to produce obstruction.

When respiration has been established and the patient is able to swallow, stimulants may be administered, consisting of a little warm coffee or whisky. The patient should be removed to a warm place, his wet clothes removed, body should be dried and rubbed, then wrapped in blankets surrounded by hot-water bags. The patient should be kept quiet and carefully treated, and if signs of collapse appear renewed effort should be made. Systematic rubbing of the skin and muscles greatly assist in promoting the circulation of the blood.

Before commencing any artificial respiration see that all clothing or other constrictions about the neck, chest, and abdomen are loosened.

Do not get discouraged at the slow results that sometimes happen when resuscitating the apparently drowned. You often have to continue a long time before signs of life are apparent. Do not discontinue your efforts until you are certain that all chance is lost. Sometimes even after several hours' work recovery takes place.

In order to prevent drowning every person should learn the art of swimming and how to keep afloat for a sufficient length of time to allow assistance to effect rescue. In rescuing a drowning person the rescuer himself should be a fairly strong swimmer and have a knowledge of the different conditions that he will have to encounter. If possible, he should remove most of his clothes, especially the shoes. He should reassure the drowning man that help is at hand. The drowning man should be approached from the rear, seized by the hair, if possible, and turned upon his back, the rescuer assuming the same position, and with the drowning person's back to his stomach he swims for the shore or floats until a boat or other assistance comes to him. If the drowning person struggles, it may be necessary to render him unconscious by a blow in the face before he can be handled.

#### RESUSCITATION FROM GAS POISONING.

In treating this condition the patient needs plenty of fresh air. Artificial respiration as described under drowning should be started at once. Stimulants and rubbing are also helpful.

#### RESUSCITATION FROM ELECTRIC SHOCK.

A person accidentally shocked by electricity is not necessarily killed. He may be only stunned or the breathing be stopped momentarily. The following instructions should be followed:

- (1) Break the circuit immediately.
- (2) Separate the victim from the live conductor by quick motion, *using some nonconductor, as dry rope, dry coat, or dry board.* The victim's clothes if dry may be used to pull him from the live wire. *Use nothing metallic.*
- (3) Beware of touching the heels or soles of his shoes.
- (4) Do not touch his body with your hands unless they are covered with rubber gloves, mackintosh, dry clothing, or other nonconducting material.
- (5) If you have to cut a live wire, use an ax or hatchet with a dry wooden handle, or insulated pliers.

After you have removed patient from wire, institute artificial respiration by the Schäfer method. Attend to the burns as described under treatment for burns (see p. 13). Apply warmth to body, rubbing skin and muscles and giving stimulants if patient can swallow.

## BITES FROM DOGS OR CATS.

If bitten by a dog or cat let the wound bleed as freely as possibly; encourage this by milking the part. Some advise sucking the wound, but this is not altogether safe, for if you have a cut or abrasion in your mouth you may infect yourself. Cauterize the wound with a hot poker, or carbolic acid, and dress with an antiseptic dressing (alcohol, bichlorid of mercury, or tincture of iodin).

It is a common error to assume that a dog with fits is rabid. As a matter of fact, fits are common from worms, from acute indigestion, and from exposure to excessive heat. On the other hand, the so-called "dumb rabies" occurs without fits and is common. No one but a skilled veterinary is competent to judge if an animal has rabies. Where a person is bitten by an animal suspected of being mad, it is not only important to treat the patient but to take steps to ascertain positively whether the bite was dangerous or not as a long time may elapse before any symptoms develop, and this period might be fraught with needless and terrible anxiety for the patient.

Keep the cat or dog under observation to see whether or not it shows signs of madness. If it does, *kill it, pack the body in ice, and send it to some laboratory for examination.*

In the meantime the person bitten should, *as soon as possible, be landed at the nearest place for the Pasteur treatment for the prevention of rabies.*

A tourniquet above the wound is advised to limit the amount of poison entering the system. If this is done, the part should be carefully watched and if it becomes blue the constriction should gradually be released; after circulation has been reestablished the tourniquet may be reapplied. Strong ammonia may be used to cauterize the wound.

## UNCONSCIOUSNESS AND INSENSIBILITY.

If the person is unconscious and the cause is unknown, let him rest flat on his back. If he is pale and surface of body is cold, apply heat to body and hold smelling salts or a little ammonia under his nose. If the surface of the body is very hot, cold water may be applied to the head.

Unconsciousness is usually due to disease of the brain or heart, general diseases, injuries to the head, or to some poison.

## FAINTING.

This results from diminution of blood in the brain, due to many causes. The person gets paler and paler; there is a sinking feeling, and he falls unconscious. This often can be prevented by placing

the patient in a chair with his head forward between his legs lower than his hips. But after its occurrence patient should be laid flat on his back with head low; loosen clothes and give plenty of fresh air; a little ammonia held under nose will often revive him. After recovery give whisky or aromatic spirits of ammonia.

## EPILEPTIC FITS.

The patient usually utters a cry, falls suddenly unconscious, has convulsions, foams at the mouth, and bites his tongue. After convulsions cease he passes into a deep sleep and remains in that state for several hours.

During the convulsions the only thing to do is to try to prevent him from hurting himself. Something suitable (a piece of wood or cork covered with a handkerchief) should be put between his back teeth to keep his mouth open so he can not bite his tongue. *Do not let this gag fall down his throat.* When consciousness has completely returned a cathartic may be given, because in those subject to epilepsy clogging up of the bowels often brings on an attack. If some time must elapse before medical aid can be obtained or the epileptic discharged, give three or four potassium bromide 5-grain tablets three times a day. The tablets should be dissolved in half a tumbler of water. A man known to have fits should not be retained aboard ship. He is unfit for the service and may injure himself seriously by falling down a hatch or in the way of machinery, etc.

## POISONS

*Prevention.*—Keep all poisonous drugs and solutions locked up. Label all bottles with their contents and a **Poison** label. See that all bottles are properly labeled and no drug is put in them that does not belong there.

In treating patients for poisoning the indications are:

1. To neutralize the poison (give antidote).
2. To get rid of the poison from the stomach (produce vomiting).
3. To prevent further absorption into the system of the poison that may have remained in the stomach (oils, etc., except in case of phosphorus poisoning).
4. To cause elimination from the system of the poison that may already have been absorbed (large drafts of water, purgatives, etc.).
5. In case of collapse, to sustain and support the body strength (by stimulants, external application of heat, etc.).

*Unknown poison.*—Produce vomiting. This can be done by giving 2 teaspoonfuls of mustard in a cup of warm water; can also be induced by 2 teaspoonfuls of common salt in a cup of warm water;

soapsuds; putting fingers down throat; and tickling back part of throat with a feather. Sirup of ipecac, 1 tablespoonful in cup of tepid water, is also a good emetic. After vomiting give whites of raw eggs, or milk, or flour in water. If signs of collapse are present, give hot tea, coffee, and other stimulants. Keep body warm and rub extremities.

*Bichloride of mercury*.—Give whites of 2 raw eggs. If these are not on hand give milk, or raw meat chopped finely in water or milk, or give soap and water. Then cause vomiting, and later give strong tea, flour in water, flaxseed tea, or barley water. Keep patient warm, and if stimulants are necessary, give strong coffee.

*Strong metallic acid (as nitric, sulphuric, hydrochloric, etc.)*.—Give no emetic. Neutralize the poison by giving alkalis, such as large quantities of water or milk with chalk, borax, baking soda, soapsuds, or plaster; raw whites of eggs in water; later, flaxseed tea, gruel, or starch.

*Carbolic acid*.—Give equal parts of grain alcohol and water. If alcohol is not on hand, give brandy or whisky and a teaspoonful of glycerin. If none of these are at hand, give vinegar, raw whites of eggs in water, or soapsuds; then produce vomiting; then give solution of Epsom salts. Do not give oils. Milk, gruel, or flaxseed tea may be given later. If there is evidence of collapse, apply heat to body, give hot coffee and stimulants, and if breathing stops apply artificial respiration.

*Alkalis (lye, etc.)*.—Give mild acids, such as vinegar, lemon or orange juice, hard cider. Whites of eggs may be given later. Assist vomiting by large amounts of tepid water; then give something soothing, such as oil, gruel, barley water, milk, butter or lard, etc.

*Opium, laudanum, paregoric, heroin, morphin*.—Give potassium permanganate solution (one-third teaspoonful in pint of water) or hydrogen peroxid (2 teaspoonfuls in pint of water); then give emetic. The best emetic in this case is mustard and hot water. Something irritating is needed to start vomiting, as the nerves of the stomach are dulled by the opium. Give strong tea or coffee; if patient is unable to swallow, inject into bowel. Keep patient awake by applying cold water to head and face, slapping him with wet towel, and walking him about, but do not exhaust patient by overdoing this. Give no wines or liquors. When respiration is slow and irregular, apply artificial respiration.

*Arsenic, Paris green, rough on rats*.—The best antidote, if it can be obtained, is two teaspoonfuls of magnesia, one tablespoonful of tincture of iron in a cup of water; take as one dose. Give an emetic: the whites of raw eggs and a large amount of greasy or salty water may be given. Lime water, or plaster in water may be given. Later

gruel, sweet oil, starch and water, and castor oil (1 ounce) may be given.

*Strychnine (nux vomica).*—Give strong tea, then an emetic. If available give, next, bromide of sodium or potassium, six tablets (30 grains) in water and repeat in a little while. Give whisky. Give Epsom salts. Apply artificial respiration if necessary. Remove patient to a dark room, keep quiet, avoid sudden noises, etc.

*Ptomaine poisoning.*—Results from eating bad meat, fish, or other articles of tainted or decayed food.

Treatment: Give emetic, then give a purge, castor oil or Epsom salts. If there is much pain in stomach, apply hot-water bag or hot cloths and a mustard plaster. Give stimulants if necessary. Give no food until symptoms have disappeared. Should be careful with diet for several days after recovery.

#### SHOCK.

As almost all injuries cause a certain amount of shock, it is well to know what it is and how to treat it. It is a profound depression of the nervous system and is sometimes called collapse, exhaustion, or prostration. In this condition the face is pale, expression is anxious, eyes dull, and pupils enlarged, skin cold and clammy; patient is listless and takes no interest in surroundings; pulse is rapid and weak: breathing may be gasping, spasmodic, or feeble.

Treatment: Place on back with head low, administer stimulants, hot coffee, tea, aromatic spirits of ammonia, whisky, or brandy. Keep up body heat, wrap in warm blankets, apply hot-water bags, and rub extremities toward body to stimulate circulation.

#### BURNS AND SCALDS.

Burns result from exposure of body to dry heat, while scalds follow exposure to moist heat, as hot water, steam, etc. These are very serious accidents, attended, at times, with marked shock, and their danger to life depends more upon the extent of the body involved than the degree.

For convenience burns are divided into three degrees, as follows:

1. Reddening of the skin.
2. Reddening of the skin with formation of blisters.
3. Charring and destruction of the deeper tissues.

There is usually considerable pain with burns and, if burn is extensive, marked shock.

Treatment: Exclude air from the part. This may be done by making a paste with water and baking soda, starch, or flour. Smear the paste on a pad of sterile gauze, apply to burn, and hold in place

by a light bandage. An excellent dressing is a solution of ordinary washing soda (2 tablespoonfuls in a pint of warm water). A salt-solution dressing is also good (a teaspoonful of common salt to pint of warm water). Do not use strong antiseptic on burns. Soaking the part in warm water is itself good and is very often useful to soak off clothing sticking to a burned surface. If blisters have formed and are painful, they may be opened by passing a sterile needle through them and allowing the fluid to escape. Do not destroy the skin raised by a blister. The needle used may be sterilized by burning in a flame. Do not put cotton next to a burn; it sticks and causes trouble. In dressing burns take pad of sterile gauze, soak in the solution, apply to part, and hold in place by bandage. In removing the dressings it is often necessary to soak them off, and warm water or one of the solutions mentioned above may be used for this purpose. An excellent dressing for burns, if at hand, is a saturated solution of picric acid. Be careful not to get it on clothing, because the stain is hard to remove. Antiseptic ointments, such as boric acid or aristol and opium, are soothing and good at times, but oils, greases, etc., as a rule are not advised, because they are liable to favor infection.

The burned part should be put at rest; and if there is much pain, 20 drops of laudanum in a little water may be given, or 1 to 2 chlorodyne tablets, repeated in two hours if necessary. There is liable to be considerable shock, so don't forget to treat it. A person badly burned should be seen by a doctor as soon as possible. If a person is extensively burned, it may be impossible to cover him with bandages. A sheet soaked in any of the above-mentioned solutions and wrapped about the person is a convenient and sometimes only way to handle the case. The early treatment of burns caused by acids is to apply a dressing soaked in an alkaline solution, such as baking soda, washing soda, limewater, soapsuds, etc.

Burns caused by alkalis are treated by acid solutions, such as vinegar, lemon juice, etc. Burns caused by carbolic acid should be treated freely with pure grain alcohol and dressed.

#### EFFECTS OF COLD.

*Freezing.*—If expecting to be exposed to the cold for a long time, endeavor to prevent any ill effects therefrom, but if freezing does occur there is marked depression and cautious treatment is necessary.

*Treatment:* The object is to restore gradually the body warmth. The patient should at first be in a moderately cold room, and with woolen cloths soaked in cold water or snow the limbs should be gently and systematically rubbed toward the body. When the circulation becomes active, the cloths should be soaked in warmer and warmer water. When patient can swallow, give stimulants, such as

hot coffee or tea, whisky, brandy, or aromatic spirits of ammonia. The patient should not be brought into a warm room, placed before an open fire, etc., until the circulation of the blood has been reestablished and is active, as evidenced by increased force of the pulse, increased warmth, and color to the skin.

*Frostbite.*—Parts most involved are those where circulation is sluggish, as ears, tips of nose, fingers and toes, etc.

Treatment: Gradually restore normal temperature. Soak part in cold or ice water. Rub gradually with woolen cloth soaked in cold water, ice water, or snow. Gradually increase warmth of water as circulation becomes reestablished and active in part, as evidenced by more warmth to skin and better color. If the frostbite is an old one and the skin has turned black or commenced to scale off, it is dangerous to attempt to restore the vitality by friction; just apply a little cotton and hold in place by a bandage; apply heat externally.

#### RUPTURE (HERNIA).

As encountered by the layman this is a swelling in the groin. Rupture makes its appearance suddenly after exertion and is evidenced by pain and swelling.

Treatment: Let patient take a hot bath and go to bed, lying on his back with thighs bent. By so doing, the rupture will often reduce itself. Keep patient in bed for several days and do not let him move until he has seen a doctor.

If the rupture does not reduce itself it may be damaged by rough or unskilled handling. The patient should see a doctor as soon as possible, as the condition, if unrelieved, *may* cause gangrene of the bowel and death.

#### STRAINS.

Condition caused by overstretching the muscles. The muscles of the back and shoulders are the ones most often involved.

Symptoms: Pain, stiffness, lameness, and sometimes swelling.

Treatment: Rest, hot applications, gentle massage with liniment.

#### SPRAINS.

Condition caused by a tearing or stretching of the ligaments and capsule about a joint. It is at times hard to distinguish from a fracture and should be cautiously handled. It often takes a long time for complete recovery.

The joints most often involved are the ankle, knee, wrist, elbow, and shoulder.

Symptoms: Pain, redness, swelling, loss of function, and often shock.

Treatment: Soak the joint in water either as hot as patient can stand or cold as you can get it, not tepid water. If it is a joint of the lower extremity, put patient to bed: elevate the limb on a pillow or other support.

If joint is bandaged, do this loosely, because there is liable to be considerable swelling, which may cause damage. When pain and swelling have subsided, gently massage the joint. Let patient get about gradually on crutches. If sprain is in upper extremity, the treatment is the same, except the patient need not stay in bed. The joint is put at rest and supported either by a sling or splint.

If shock is present, it should be treated.

#### HEMORRHAGE.

The heart may be considered as a pump, which by its beats forces the blood to all parts of the body through a series of tubes. The arteries carry the blood from the heart: the veins return the blood to the heart. The capillaries are a network of smaller vessels situated between the arteries and veins.

Remember that in the character of wounds that you will encounter death from bleeding is very rare. Bleeding is dangerous when a large artery is injured. In the majority of cases of bleeding all that will be necessary to do is to put a gauze compress over the wound and hold it in place by a firm, snug bandage; put the injured part at rest: if arm or leg, elevate: keep the patient quiet and give plenty of fresh air. Very hot water applied will at times do good.

If, however, bleeding is profuse and life seems endangered, it may be necessary to apply some kind of tourniquet. Arterial bleeding is most dangerous and is recognized by the fact that the blood is bright red in color and is expelled in jets.

In venous bleeding the blood is dark blue and flows in a constant stream.

Capillary bleeding occurs as a general oozing and is of a brick color.

Tourniquets may be improvised, as a clean handkerchief bandage, soft-rubber tubing, or other similar material, encircling the limb, and tied sufficiently tightly to stop the flow of blood.

*Tourniquets in the hands of laymen are extremely dangerous and should not be used unless absolutely necessary, which is rare.* When used, the part should be carefully watched, and if signs of extreme swelling or bluish color appear the tourniquet should be loosened. A tourniquet should not be left on at one time more than one-half hour. It should then be loosened and, if necessary, retightened. The arms and legs are the only parts to which tourniquets should be applied.

*Arterial hemorrhage.*—Apply the tourniquet between the heart and the wound; generally speaking, above the wound. Place a compress over the wound and hold by snug bandage. Put part and patient at rest.

*Venous hemorrhage.*—Apply tourniquet on far side of wound from heart; generally speaking, below the wound. Then treat as above.

*Capillary oozing.*—Pressure by compress and bandage applied over the wound is all that is usually necessary.

Bleeding can often be stopped by pressure from the thumb, or anything else suitable, over the injured artery or vein, as the case may be.

It is often difficult to determine whether the blood is from an artery or vein. In such a case, if a tourniquet is necessary, apply it above the wound; and if injury is in arm or leg, apply your compress over the wound, hold it with a snug bandage, and put part at rest, elevated. Remember that tourniquets, as a rule, are condemned and should not be used by the layman unless necessary, which will rarely be the case.

The main arteries in the body which play a part in external hemorrhage are four, namely, the *carotid*, which supplies the head; the *subclavian*, supplying the middle of the shoulder; the *brachial*, running along the inner side of the arm and supplying the arm, forearm, and hand; and the *femoral*, running along the inner side of the thigh and supplying the thigh, leg, and foot. The pulsations in these arteries should be studied, as pressure at the correct spot on them will often check external hemorrhage in the extremities, neck, or head.

*Internal hemorrhage.*—Caused by wounds usually of abdomen or chest. No external evidence of bleeding. Symptoms are those of shock. Treatment: Rest in bed; ice bag or cloth to chest or abdomen. Do not give stimulants unless patient becomes very weak.

*Nose bleeding.*—Place patient in chair with head thrown back. Apply cold cloths to back of neck. Place a small wad of paper well up between the upper lip and gum. Finely crushed ice on gauze or thin cloth applied to bridge of nose is often effective. May snuff salt water up nose. If it still persists, small strips of gauze with ends hanging out may be pushed up the nostrils. Keep patient quiet and caution him not to pick off or blow out the clots as they form in the nostril. These clots are nature's stoppers. Have him breathe through the mouth and leave his nose alone.

#### BANDAGING.

Those bandages most frequently used are the—

1. Roller bandage.
2. Triangular bandage.
3. Many-tailed bandage.

Bandages are used (1) to hold dressings in place, (2) to hold splints in place, (3) to check hemorrhage, (4) as slings.

Materials most commonly used for bandages are (1) gauze, (2) muslin, (3) flannel, (4) plaster. The gauze and muslin bandages are the two that the layman will be called upon to use, generally gauze. Good bandaging comes by practice, and all that will be expected of the layman is the application of the bandage so it will accomplish its object, be comfortable to the patient, and do no damage. Bandage uniformly, firmly, but not tightly. In bandaging arm or leg commence from below and bandage up. Leave the tips of fingers and toes unbandaged, so the effect of the bandage on the circulation can be watched. In bandaging a part that is liable to swell, bandage loosely, so if the part should swell the bandage will not be too tight and constrict. Do not apply a bandage when wet, because when it dries it will shrink. In bandaging apply the bandage to the part in the position in which the latter is to be carried during treatment. A bandage should not be put on under a splint, but always over it. The triangular bandage is probably the easiest for general application by the first aider. However, the roller bandage is supplied to auxiliary ships and is the one that probably will be most used by first aiders of these vessels. The triangular bandage is usually made from unbleached cotton cloth, though any strong cloth will do, as bed sheets, pillow covers, napkins, handkerchiefs, etc.

A triangular bandage is extremely useful because of its simplicity. It can be used as a tourniquet, as a sling for arm or forearm, and to retain a dressing. The black-silk neckerchief furnishes a good triangular bandage or one can be made by cutting in two, diagonally, a square of muslin or sheeting 34 inches on each side.

To use the triangular bandage as a sling or tourniquet, bring the apex or point of the triangle over to the base and then fold the whole again on itself. If the ends are now knotted at the back of the neck, the hand or forearm can be passed through and supported by the loop thus made. Or fold the triangular bandage with its base up and down (vertically) along the front of the body from collar bone to thigh, with the apex or point of the triangle pointing to the injured side. Bring the forearm to be supported across the bandage. Next bring up the lower end of the base in front of the injured forearm and knot the two ends of the base behind the neck. The apex is now folded inward across the arm above the elbow and pinned to the front and back portions of the sling.

To hold a dressing in place on hand or foot, or to protect them, proceed as follows: Fold the base over on itself a couple of inches. Lay this folded base of the triangle under the wrist or under the sole of the foot a few inches back of the heel. Bring the point or apex up over the fingers to the wrist or over the toes to the instep

and ankle. Now, wrap the long ends of the base round and round wrist or ankle and tie. The point or apex caught by the circular turns is folded back over the knot and pinned. The same principle can be used on almost any part of the body. For example, to cover over the scalp, lay the apex or point on the center of the forehead, extending down on the nose, while the base lies on the back of the head and neck. Bring the ends of the base forward and upward just above the ears and tie them low down over the center of the forehead. The apex or tip is now folded back over the knot and secured with a safety pin.

*Roller bandages.*—These are furnished already prepared, but in an emergency where none are at hand they can be improvised from sheets, pillow covers, muslin, flannel, etc. Those that are furnished come in different widths and lengths. The size to be used depends upon the part to be bandaged.

For the fingers and toes the one about three-fourths inch wide should be used.

For the arm and head use one about  $2\frac{1}{2}$  inches wide.

For leg and thigh use one about 3 inches wide.

For the chest and abdomen use one about 4 inches wide.

For general use the most serviceable bandage is about  $2\frac{1}{2}$  inches wide and about 4 yards long.

The roller bandage is applied by holding the roller in the right hand and the free loose end in the left, and the outer side of the bandage is applied on the place where it is desired to start the bandage. In securing the bandage the free end is turned back and pinned, preferably with a safety pin, or the end may be ripped up the middle a sufficient distance, then a knot tied to prevent further ripping, and the ends carried around the limb in opposite directions and tied.

#### BRUISES AND CONTUSIONS.

These are conditions where the soft tissues below the skin are injured and torn, the skin itself remaining intact. There is hemorrhage under the skin, but the blood does not escape.

Symptoms: Pain, loss of function, swelling, and discoloration (red, purple, black, green, and yellow).

Treatment: Put the part at rest. Apply cold applications, except in the feeble or aged, where hot applications are better.

#### WOUNDS.

These are usually divided into the following classes:

1. Incised.
2. Lacerated.

## 3. Punctured.

## 4. Poisoned.

## 5. Gunshot.

Incised wounds are those caused by sharp instruments, such as razor, sharp knives, glass, etc.

Lacerated wounds are those caused by a blunt instrument, by machinery, falling block, etc.

Punctured wounds are those caused by deep, pointed instruments, such as a nail, dagger, bayonet, etc.

Poisoned wounds are those caused by bites of animals, stings of insects, etc.

The term "gunshot wounds" is self-explanatory.

Symptoms of wounds: Local—(1) pain; (2) hemorrhage; (3) loss of function; (4) gaping of edges. General—shock.

The dangers from wounds are hemorrhage and infection. As we have seen, grave hemorrhage is usually rare, and a compress and bandage is usually all that is necessary to check it. Infection is the main danger. By this is meant the introduction into the wound of germs, which will cause pus and later trouble. Our main effort in treating wounds is to prevent infection.

*Treatment of wounds.*—Prevent infection. Do not touch the wound with your dirty fingers and do not let the patient do so with his. If wound is not extensive and there is very little bleeding or dirt or foreign particles in it, apply into and for about  $1\frac{1}{2}$  inches distance around the wound tincture of iodine, either in full strength or diluted one-half with water or alcohol. Then apply to the wound a sterile gauze compress and hold in place by a snug bandage.

If the part injured is a hairy part of the body, it should be shaved before treatment. If iodine is to be used, it would be better to shave the part dry, as iodine is less active on a moist surface.

Before dressing a wound the dresser should see that his hands are surgically clean. To render them so, scrub for five minutes with a nail brush, hot water, and soap. Rinse off soap with hot water, then soak hands in hot bichloride of mercury solution (1-1000), carbolic acid solution (1-100), alcohol, or other antiseptic solution. If nothing else is at hand, use whisky or brandy, or, better still, paint the hands thoroughly, front and back, with tincture of iodine. *If none of the above antiseptics are at hand, thoroughly scrub your hands with hot water and soap for at least 10 minutes, and do not put your fingers into the wound unless absolutely necessary.* These are the two essential features of aseptic work.

If foreign particles are in the wound they may be picked out with a pair of sterile forceps. If it becomes necessary to wash a wound to get the dirt out, use sterile hot water, soap, and a pad of sterile gauze as a sponge. A boiled common-salt solution (1 teaspoonful to

a pint of water) is a very good one to wash and dress wounds with. Be sure your water is sterile before applying it to the wound. (Should boil at least 20 minutes.)

The dressing contained in the first-aid packet, although intended for a gunshot wound of small caliber, makes an excellent dressing for any wound it will cover and may be applied after the wound has first been treated with tincture of iodine, if on hand.

In case of a jagged and bruised wound, with its edges far separated, strips of gauze should be laid in the wound before being finally dressed.

It is better for the layman not to sew a wound, but at some time or other it may be necessary. Sometimes in wounds of the scalp the best way to check the hemorrhage is to bring the edges of the wounds together by suture. Usually, however, a bandage or tourniquet carried around the forehead just above the eyebrows, then just above the ears, and continued low down on the back of the head to the starting point and drawn tight will stop bleeding of the scalp. A stitch may prevent marked scarring. However, this should not be given much consideration by the aider, except for cosmetic purposes on exposed parts of the body. If you do suture a wound, remember that your hands, needles, all instruments, etc., that come in contact with the wound should be sterile.

The stitches should pierce the skin about one-eighth inch from the edge of the wound, and they should be placed about one-half inch apart, tied, and cut off. They should not be tied too tightly, only sufficient barely to bring the edges together. It is better not to close the wound entirely, but to leave a little opening at its lower end, where a little wick of sterile gauze may be inserted for drainage. If after stitching a wound it becomes red, swollen, and painful, or there is other evidence of pus forming, the stitches should be removed and the wound left open. Carry the needle through the entire thickness of the skin. Remember that occasions will be few where a layman will have to stitch a wound.

In all wounds put the part at rest and treat shock if present.

To treat gunshot wounds, see instructions in first-aid packet.

*Sterilizing dressings.*—An easy and convenient way is by boiling in plain water for about 20 minutes. If a dry dressing is desired, it can be sterilized by placing in a hot oven for about 20 minutes and removed just before scorching. Sterile dressings can be bought. The contents of a first-aid packet are sterile.

*Sterilizing instruments.*—The scissors, forceps, knives, needles, etc., used in dressing wounds should be sterilized by placing them in water that has been brought to boiling point and boiling them for 15 to 20 minutes. If, on hand, a little soda added to the water will greatly assist the sterilization and protect the instruments. It is

better to protect the blade of the knife by wrapping a little cotton around it before boiling.

Remember that in dressing wounds you apply your pad of sterile gauze, then your bandage. In large wounds, or those from which there is liable to be considerable oozing, it is probably better after the pad of sterile gauze has been applied to apply several layers of absorbent cotton, then bandage. Do not put the cotton next to the wound.

#### DISLOCATIONS.

These are injuries to joints; the head of a bone has slipped out of its socket.

Causes: (1) From a blow or fall; (2) muscular action.

Symptoms: Pain, swelling, loss of function, limited motion, and the head of the bone is noted as out of its usual place. The limb may seem lengthened or shortened, according to the way in which the dislocation has taken place.

Treatment: The proper treatment is reduction and retention by some means of immobilization.

It is better for a layman not to attempt reduction except, perhaps, in dislocations of the fingers and lower jaw. By unskilled attempts at reduction a layman may cause considerable damage to the nerves, vessels, and soft parts.

Put the part in the position most comfortable to the patient. The joint should be surrounded with cotton and a bandage applied, not too tight, and then supported. The patient should be kept as quiet as possible. If the joint involved is the shoulder, elbow, hip, knee, or ankle, the patient should be kept in bed. If the joint is painful and greatly swollen, hot or cold applications may be applied. A sling makes a good support to the shoulder, elbow, and wrist joints. If shock is present, treat it. Have patient see a doctor as soon as possible.

#### SPLINTS.

Before considering fractures it becomes necessary to know something about splints, the correct application of which is so essential in the treatment of fractures.

We understand by a splint a more or less stiff support that will immobilize a fractured bone or a joint. It can be made from pieces of wood, broom handles, cardboard, wire netting, rolls made of blankets, pillows, rifles, swords, bayonets, etc. The material should be rigid enough to keep the parts in position. The splints should be long enough to prevent movements in the nearest joints and as wide or wider than the limb to which applied, so that the bandages which hold them in place will not press on the limb. They should be

well padded with cotton or other soft material, as wool, oakum, flannel, etc., before being applied. The padding should extend well over the side of the splint. After splint has been well padded and applied to the limb it is held in place by a snug bandage. The bandage should not be applied too tightly, and if pain and swelling occur it should be loosened.

#### FRACTURE (BROKEN BONE).

Causes: (1) Direct violence, (2) indirect violence, (3) muscular action.

Symptoms: (1) History of injury, (2) pain, (3) swelling, (4) loss of function of parts, (5) usually shortening, (6) excessive mobility (movement) where there should be none, (7) crepitus or grating of the ends of bone.

#### Varieties:

Simple fracture, where the skin is intact and there is no external wound.

Compound fracture, where the skin is broken and the external wound communicates with the fractured bone.

Complete fracture, where the break extends through the entire bone.

Incomplete fracture, where the break is not entirely through the bone.

Treatment: Along general lines. The thing to do is to set the bone and hold it in place by means of splints. A broken limb should be handled as gently as possible. It is usually best not to move patient, especially if break is in lower extremity, until splint has been applied. In handling a fracture the limb should be grasped above and below the seat of fracture.

To treat fracture, say, of the arm or leg, grasp the limb above and below the seat of break, make gentle extension and counterextension (pulling in one direction on one fragment and pulling in the opposite direction on the other) in line of body, and while held in that position by an assistant splints should be applied. Observe the precautions mentioned under the heading of splints. After application of splints the limb should be supported and elevated over pillows, clothes, sheets, etc. After application do not remove splint unless it becomes loose or shows evidence of being too tight, etc. Let patient see a doctor as soon as possible.

*Compound fracture.*—Dress the wound, then apply splint. Splint should be so arranged that wound can be dressed if necessary. In all fractures you may have to treat shock. Remember the one great thing in treating fractures is to keep the bone at rest, so do not move the limb or let the patient move it without reason.

## SPECIAL FRACTURES.

*Fracture of skull.*—These are very serious injuries. Apply sterile dressing to wound. Place patient in lying position with head slightly elevated. May have to treat shock, but do not give stimulants unless patient is very weak.

Whenever a man is unconscious from overindulgence in alcohol, it is well to bear in mind the possibility of fractured skull and brain injury also. This is especially true where there is any mark of a blow or cut, however slight, on the head. With such a complication the gentlest treatment is necessary.

*Fracture of nose.*—Treatment: Put bones in natural position. Put small compress of gauze on each side of nose, then a piece of adhesive plaster across nose from cheek to cheek. If adhesive plaster is not at hand, put bandage across nose and around head. Do not tie too tightly.

*Fractured back.*—Keep patient still and quiet on his back. Treat shock.

*Fractured lower jaw.*—Treatment: Raise the broken bone and bring lower teeth against upper and hold there by a bandage carried under the chin, tied over the head and maintained in position by pinning to another bandage running horizontally around brow and back of head. The mouth should be kept clean by a little warm water, plain, or to which a little soda or salt is added if on hand. The patient will have to subsist for a while on liquid food through a tube.

*Fractured collar bone.*—Apply a pad of gauze in the armpit of the injured side. Support the arm in a sling with the forearm at right angles to the arm and across the chest.

*Fracture of rib.*—Keep patient quiet in bed. With arms over head and chest emptied of air, apply snugly a wide roller bandage or adhesive straps around chest, the straps as indicated for pleurisy.

*Fracture of the upper arm.*—Straighten so as to put in natural position. Secure two splints (flat wood shingle, cardboard, etc.), one to extend from shoulder to elbow, the other from armpit to elbow. Pad well with cotton, apply one to inner and one to outer side of arm, secure by bandage, and support in sling.

*Fracture of forearm.*—Straighten as above; secure two splints as above to extend from a little below elbow to middle of hand. With forearm across chest and thumb up apply padded splints, one to outer and the other to inner side of forearm; then support in sling.

*Fractured wrist.*—Treat like fractured forearm.

*Fractured fingers.*—Draw gently into natural position. Apply narrow padded splint to palm surface of finger, hold in place by narrow bandage, and support forearm and hand in a sling.

*Fractured hand.*—Apply padded palm splint as wide as the hand and to extend from above the wrist to beyond tips of fingers; hold in place by a bandage and support forearm and hand in sling.

*Fracture of thigh.*—By gentle extension and counterextension pull parts into natural position (p. 29). While limb is held by an assistant, apply a well-padded outer splint to extend from armpit to below foot. Then apply a well-padded inner splint to extend from crotch to below foot. Hold splints in place by a snug bandage.

If nothing else is at hand, the injured leg may be splinted by bandaging it to the other leg.

*Fracture of lower leg.*—An excellent splint can be made by placing the leg on an ordinary pillow and tying the pillow around it; fastenings above and below should be well away from point of fracture. Wooden splints may be applied on the outside of the pillow, extending from above the knee to below the ankle. The wooden splints, well padded, may be applied without the pillow.

*Fractured kneecap.*—Straighten leg. Pad well a wooden splint as wide as the thigh and long enough to extend from middle of thigh to middle of lower leg. Apply splint to back of thigh and leg, with center opposite bend of the knee. Secure by strips of bandage. Do not bandage directly over break, but one strip above and one below knee.

*Fractured foot.*—Apply a well-padded splint as wide as foot from heel to toes. Elevate and support.

#### VENEREAL DISEASES.

*Gonorrhea (clap).*—Inflammation of the urethra due to micro-organisms called gonococci. Usually occurs in from three days to two weeks after exposure, oftenest during the first week. First there is noticed an itching sensation, with a slight puffiness and redness about the lips of the opening. This is soon followed by a creamy discharge. There may be marked burning and difficulty in urinating. May have such complications as chordee, phimosis, paraphimosis, orchitis, or bubo.

The disease usually subsides in from one to three months. It is often difficult to tell absolutely when it is cured. The gonococci may invade the blood stream and attack numerous organs of the body.

Treatment: Rest is essential, and if any of the complications are present rest in bed is absolutely necessary. Should drink plenty of water, avoid stimulants (alcohol, tea, coffee), and be regular in eating and sleeping. Avoid eating greasy food. Keep bowels well open and bathe frequently in hot water, if practicable.

A 10 per cent colloidal silver solution is an excellent injection. Injections should be twice a day, or, if discharge is profuse, three times

a day. Injection of warm sterile plain water or salt solution may be used.

Before injection urinate, then run the solution into the canal from a penis syringe and hold solution in canal from 5 to 10 minutes before allowing to escape.

The penis should be kept clean, thoroughly bathed in hot water or hot salt solution (1 teaspoonful of common salt to pint of water).

Do not put cotton over the head of penis, but take a small piece of gauze, slit it in the center, and slip back over the head of penis and pull foreskin down over it; this will catch the discharge. The ends of the gauze should be sufficiently long to extend out over the head of the penis.

If urination causes pain or burning immerse penis in a basin of hot water and allow urine to flow. Increase the amount of water drunk and add to each tumbler a pinch of soda.

Remember this is a contagious disease and you are liable to convey it to others. You should use your own towels and have your clothes washed separately. Your hands should be washed thoroughly after handling your penis. Be careful not to carry any of the pus into your eyes. By so doing you are liable to set up trouble there, which often causes complete blindness. Keep your fingers away from your eyes. Avoid all violent exercise. It may be well to wear some support for your testicles. This may prevent a swollen and painful testicle.

*Chordee (painful erection, especially at night).*—If this occurs, apply cold applications. Avoid too warm bed clothing. Keep bowels open. Keep mind clear of sexual thoughts. Empty bladder before turning in. Sleep on side.

*Phimosis.*—The foreskin is elongated and contracted down over the head of penis.

Treatment: Soak in hot water or salt solution, and inject same under the foreskin.

*Paraphimosis.*—A condition where the foreskin is swollen, rolled back, and tight.

Treatment: About the same as for phimosis. Patient should be put to bed in treating the above complications. Get a doctor.

*Bubo ("blueballs").*—Swollen glands in the groin.

Treatment: The most important thing is rest in bed. Cold applications are effectual at the outset, but later hot ones are better. If suppuration occurs (pus forms), an incision may be necessary. This should not be done by a layman. In time the abscess will break of itself. Wash out with sterile, warm, plain water or salt solution, apply wicks of gauze in the opening for drainage, and dress. Should be redressed as often as dressing becomes soiled. Burn all soiled dressings and wash your hands after dressing a bubo.

*Orchitis (swollen testicle).*—Not an infrequent complication.

Treatment: Rest in bed most important. Support and elevate the testicle. Apply cold or hot application; hot is probably more agreeable. Keep bowels open.

*Stricture of urethra.*—Usually a later complication and probably you will not have to treat. Sometimes, however, it does not occur in early stages and patient is in great pain and unable to pass his urine. You may induce him to void his urine by applying hot applications over the bladder or placing him in a hot bath. If tincture of belladonna is at hand 20 drops may be administered.

If the condition is urgent, and a doctor can not be gotten, as the last resort you may attempt to pass a catheter, if one is at hand. It should be sterile (boiled) and well greased with oil, albolene, glycerin, etc. It should be manipulated gently and with as little force as possible.

*Chancroid.*—A soft chancre, venereal ulcer upon the penis. Usually occurs from 2 to 10 days after exposure. Is sometimes hard to differentiate from hard chancre—primary stage of syphilis. Sore may be mixed—both chancre and chancroid. Keep sores clean with soap and warm water, then wash with warm salt solution (1 teaspoonful of common salt to pint of water). This should be done several times daily. The same general rules about attention to the cleaning of hands of both patient and aider after handling penis apply here as in gonorrhea. Also attention to towels, etc., of patient, to prevent its spread to others.

The most frequent complications of chancroid are bubo, phimosis, and paraphimosis; and the treatment of these is as given under gonorrhea.

*Syphilis.*—This is a very virulent and severe communicable constitutional disease, and is usually acquired during sexual contact. It may, however, be contracted otherwise. The primary lesion of syphilis is a sore called a chancre, and starts at the point of inoculation of the virus. If due to sexual contact, it is found upon the penis. It may start upon the lips, tongue, or tonsils. It usually appears from three to six weeks after exposure. However, the sore may not develop for 90 days after exposure. The average is about one month. It may appear as early as 10 days. It usually starts as a papule or pimple, which breaks in the center and forms an ulcer with hardened edges. This is soon followed by enlargement of the glands in groins and neck. In about one or two months the skin eruption appears. There may be sores on the lips, tongue, or cheeks, and a general sore throat. Hair may fall out. May complain of headache, general muscular and bone pains, fever, and the whole system may become involved.

Treatment: A man in the active stage of syphilis should not be allowed to start on a cruise. He is a menace to himself and others. If it breaks out on a voyage, he should be more or less isolated. Should use his own mess gear, drinking cups, towels, toilet articles, etc. The contagion is most liable to be carried from man to man by the saliva, and so the syphilitic should be forbidden to lend his pipe, roll a cigarette for another person, etc. He should not be detailed for work as a messenger, cook, mess attendant, or for any work about the galley. The primary sore should be kept clean with warm water and soap and then washed with warm salt solution. The mouth and teeth should be kept clean. The mouth may be washed out with sodium bicarbonate solution, or if sores appear in mouth, by a mild antiseptic solution (potassium chlorate) if on hand.

The clothes of a man suffering from syphilis should be washed separately from the rest of the crew.

The patient should see a doctor for treatment and advice as soon as possible. The same precautions as given under gonorrhea and chancroid should be observed in regard to chancre and syphilitic sores to prevent spread of the disease to others.

Under no circumstances should anything that has been used in the mouth of a person with active syphilis be used by others.

The person should use his own mess gear, etc., as stated above, and this should be thoroughly scalded out after each using with boiling water.

## CHAPTER III.

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### SPECIAL DISEASES.

#### FEVERS.

By fever we mean a rise in the temperature of the body, accompanied by a general disturbance of health. Some fevers are infectious; that is, they may be conveyed from one person to another; but it is probable that all fevers are due to germs.<sup>1</sup>

#### TYPES OF FEVERS.

1. *Continued fever*.—Where there is a variation of less than 2° between the morning and evening temperatures; these do not come down to normal.

2. *Remittent fever*.—Where there is a variation of more than 2° and the temperature does not come down to normal.

3. *Intermittent fever*.—Where there is a variation of more than 2° and the temperature *does* come down to normal at least in every 24 hours.

#### TERMINATION OF FEVER.

1. *By crisis*.—When the temperature comes down suddenly.

2. *By lysis*.—When the temperature comes down gradually.

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<sup>1</sup> In taking the bodily temperature the small clinical thermometer with a scale ranging from 92° to 110° F. is employed in this country.

To read the height of the mercury column some practice is necessary. The front aspect of the glass tube is conical, in order, by refraction of light, so to broaden the image of the mercury column as to make the latter more readable. Hold the apex or sharper edge of this cone toward you, and gently turn from side to side until the flash of the broad metallic column strikes the eye, then hold in that position and read the degree at the top of the column.

Familiarize yourself with the normal height, 98.6°, denoted by a special marking. Always see that the mercury is below this before taking a temperature.

To force the mercury down hold firmly in hand by upper end, and following repeated smart, snappy swings of the forearm, as if working a pump handle, the column will be found to have been carried down.

Temperature by mouth is taken as the normal standard; by rectum it is roughly one degree higher, in armpit one degree lower than by mouth. Leave the thermometer in position for three minutes before reading.

After using, clean in cold water, and immerse for 20 minutes in bichlorid, 1-1000, or carbolic acid, 1-20.

## INFECTIOUS FEVERS.

## 1. Those common in the United States:

## (a) Those accompanied by rash—

Chicken pox.  
 Scarlet fever.  
 Smallpox.  
 Measles.  
 German measles.  
 Typhus fever.  
 Typhoid fever.

(b) Those *not* accompanied by rash—

Mumps.  
 Whooping cough.  
 Diphtheria.  
 Influenza.

## 2. Those met with abroad:

Malta (or Mediterranean) fever.  
 Malaria.  
 Cholera.  
 Dysentery.  
 Plague.  
 Yellow fever.  
 Dengue.

In dealing with infectious disease the following terms are employed:

*Incubation period.*—This is the time which elapses between the date of infection and the appearance of the first symptoms. During this period the germs of the disease are growing and multiplying in the body.

*Quarantine period.*—This is the time during which apparently healthy people are isolated after being in contact with a case of an infectious disease to see if the infection has occurred. This period is always two or three days longer than the incubation period.

*Isolation period.*—This is the time during which the patient suffering from an infectious disease is kept by himself because he is infectious to others.

In describing the rash which accompanies infectious fevers the following terms are used:

A *papule* (or pimple) is a small, red, solid elevation of the skin.

A *macule* is a small spot of congested skin; it is larger and flatter than a papule.

A *vesicle* is a small collection of serum under the skin; i. e., a water blister.

A *bulla* or *bleb* is a large vesicle.

A *pustule* is a small collection of pus under the skin or infected papule.

A *scab* is an irregular mass of dried serum or pus.

A *scale* is a particle of dried skin that peels off.

In infectious fevers the rash appears after a certain definite interval from the commencement of the illness, and to remember the day on which the rash appears the following is sometimes used: Learn this sentence, "*Very sick people must take no exercise*," and apply it thus:

	Disease.	Day on which rash usually appears.
1. Very.....	Varicella (chicken pox).....	First day of illness.
2. Sick.....	Scarlet fever.....	Second day of illness.
3. People.....	Smallpox.....	Third day of illness.
4. Must.....	Measles.....	Fourth day of illness.
5. Take.....	Typhus fever.....	Fifth day of illness.
6. No.....	No disease.....	
7. Exercise.....	Enteric (typhoid fever).....	Seventh day of illness.

Infection is spread in various ways—by actual contact, by the air, food or drink, clothing, books, utensils, etc.

The most infectious part of a patient may be his breath, saliva, urine, or feces, or discharges from the throat, nose, or ears.

#### PREVENTION OF THE SPREAD OF INFECTION.

1. *Isolation*.—As soon as a case is suspected of being infectious the patient should be kept away from other persons. On board ship any suitable place may be employed, such as a spare cabin, chain locker, a boat roofed over with tarpaulin, any compartment which can be afterwards thoroughly disinfected and where the individual will not come in contact with the rest of the crew. The patient should be sent to a hospital as soon as the proper authority has been obtained from the quarantine officer of the port or other authorized person to land him. The person detailed to attend an infectious case must not mingle with other people. The patient must have his own separate utensils, cup, plate, knife, fork, and spoon, etc., and use a commode and urinal instead of the general head. Isolation must be complete, so that there is no possible way by which infection can be carried to others.

2. *Disinfection*.—By disinfection is meant the killing of the germs of the disease. This is carried out by heat, by chemicals, or by fresh air and sunlight.

Disinfection by heat: Boiling in water is the best and surest method of disinfection, but it can not, of course, be used for every infected article. For bedding and clothing a steam disinfector is used. This

consists of two large metal cylinders, one inside the other, leaving a space between inclosed at the ends by hinged doors. The articles to be disinfected are put into the inner chamber through the door, which is then closed, and steam turned into both the inner and outer chambers, so that the steam in the inner chamber, being under pressure, attains a temperature of about 240° F. After about 30 minutes the articles are removed through the door and hung in fresh air and sunlight to dry. (See also chapter on Quarantine.)

#### GENERAL TREATMENT OF INFECTIOUS DISEASES.

The fundamental principles of the treatment of infectious diseases are:

1. Rest.
2. Diet.
3. Fresh air.
4. Hydrotherapy (the use of water, hot or cold, as baths or for sponging).
5. Drugs.

*Rest.*—Should be actual rest, in a comfortable bed, placed in a quiet, well-ventilated compartment, and every means exercised to relieve the patient from anxiety and concern and to promote sleep.

*Diet.*—Should be liquid or semisolid, such as milk, raw or soft-boiled eggs, tapioca, cornstarch; chicken, beef, or mutton broths seasoned and thickened with rice. Food should not be urged in the early hours or days of a disease against the patient's disinclination to take food. However, when the patient has lost his aversion for food it should be appreciated, and the appetite catered to as far as may be consistently done, keeping in mind the general diet of liquids or semisolids, as given above. Water, or such drinks as lemonade, limeade, orangeade, or carbonated water should be given frequently and offered to the patient, not waiting for his request, because frequently there is a mild delirium, and the patient's state of mind will not cause him to ask for water though he needs it in abundance to keep kidneys and skin active.

*Fresh air.*—Means of supplying abundant fresh air, preferably cold air, should be provided. If practicable all cases of fever should be treated in the open air on deck, but if the weather is particularly cold the patient should be kept warm, covering the bed clothing with a rubber blanket and all tucked well in under the mattress to prevent the cold air getting under the bed clothing; a hot-water bottle placed at the feet gives great comfort in treating the patient in the open.

*Hydrotherapy.*—The effects of cold water are the same as the effects of cold air. Water is a conveyor of heat, and cold stimulates

vital centers reflexly through nerves from the skin. The essentials to success in using water as a means of treatment are, the water must be cold and friction must be applied, rubbing the skin vigorously until the patient reacts. Cold baths should never be carried to the extent where patient collapses.

*Drugs.*—At the beginning of a fever a drug to open the bowels freely should be given. Usually castor oil in two-tablespoon doses, or Epsom salts, two-tablespoon doses in water, or divided doses of calomel, giving one-tenth of a grain every 20 minutes for 10 doses, followed in 12 hours by an ounce of Epsom salts. This movement of the bowels relieves stagnation and absorption of products of putrefaction. Seiler's solution, 4 tablets dissolved in a pint of water, should be used frequently to clean the nose and mouth during fever; stimulants when the heart begins to fail; phenacetin or aspirin in 5-grain doses for the relief of headache and muscular pains.

Careful nursing is an essential in the treatment of all disease; and while it is not to be expected that the nursing available on board auxiliary ships will be as efficient as that which may be had from persons trained in the art of nursing, much may be done to aid the sick if attention is given to providing for their wants and promoting their comfort. A sick man should have a man detailed to wait on him and watch him. This makes rest possible for the patient. Fever patients often get delirious; and if not watched, may injure themselves, jump overboard, etc.

Keeping the patient's face, hands, and body clean and the nose and mouth clear and moistened (a little glycerine and water, to which may be added a small pinch of soda, is useful to wet lips, tongue, and inside of cheeks with), reflexly makes him feel fresher and better able to combat the germs and toxins of disease.

#### INSTRUCTIONS TO BE GIVEN TO THE PERSON DETAILED TO CARE FOR AN INFECTIOUS DISEASE.

1. Wash your hands as soon as possible after touching the patient, his clothing, or bedding, also after handling the bedpan, urinal, thermometer, etc.

2. *Wash your hands carefully before eating your meals.*

3. Never use cups, plates, spoons, knives, forks, etc., which have been used by the patient. Keep your own utensils in a separate place so that you will know that you are always using the same articles.

4. See that your patient does not mix with the other people of the ship.

5. On no account are you yourself allowed to mingle with others of the crew, etc.

6. Never eat your meals with the patient.

7. Wear white clothes (because these can be washed and boiled more easily).

#### CHICKEN POX.

Incubation period, 10 to 16 days.

Quarantine period, 18 days.

Isolation period, until all scabs have fallen off. usually 21 days.

Symptoms: Rash appears on the first day of the illness and consists of blisters, which dry and form scabs. The blisters come out in crops mostly on the trunk, face, and scalp, and only a few on the limbs. There is usually very slight fever, and the patient does not feel very ill. The blisters which form on the scalp may be painful and prevent sleep.

Treatment: Put to bed if there is fever, otherwise not necessary. Diet, no change unless there is fever, then exclude solids. Give water freely. For itching, wash parts gently with a solution of sodium bicarbonate, 1 tablespoonful to a pint of water. Keep mouth clean with Seiler's solution. Keep bowels open with salts (Epsom), 1 tablespoonful in water.

#### SCARLET FEVER.

Incubation period, 1 to 8 days, usually 3 to 5.

Quarantine period, 10 days.

Isolation period, until scaling and sore throat disappear: never less than six weeks.

Symptoms: These come on suddenly, the most marked being fever and sore throat.

The rash appears on the second day and consists of bright-red papules set very close together, which give the skin its scarlet hue. It is seen first on the neck and then spreads to the chest, arms, abdomen, and legs. It is usually most marked on the neck, the flanks, the buttocks, the bend of the elbows, and on the inner side of the thighs and knees, but never appears on the face. It usually lasts about five days.

The throat remains sore for some days, the tonsils are red and swollen and often covered with yellow patches. The tongue is at first covered with white fur through which the red papillæ show, giving it the appearance of a strawberry. Later when the fur disappears the tongue becomes very red. The fever is usually high and lasts about a week. It may cause some flushing of the face, which must not be mistaken for the rash.

Desquamation, or peeling of the skin, commences as the rash disappears, and is first noticed on those parts of the body where the rash was most marked. It commences as a small white spot, in the

center of which a hole appears. From this center a circular scale separates. This pinhole peeling is characteristic of scarlet fever. The scales may be small or may come away in large flakes. The last parts to peel are the palms of the hands and the soles of the feet.

Treatment: The patient should be kept in bed even in the mildest cases, on account of possible inflammation of the kidneys, which is the most serious complication of this disease. The body should be sponged daily during the fever with warm water in a warm room, under a blanket, exposing one part of the body after another.

The diet should be restricted to milk, giving two quarts a day during the fever. If milk is not available, gruels made from cereals, arrowroot, cornstarch, barley flour, or tapioca may be substituted. Feed at two-hour intervals, but do not interrupt sleep at night. Water, lemonade, orangeade, limeade, etc., sweetened, should be given freely. No *meat* broths should be given, or solid food.

Particular care should be given to the nose and mouth, and they should be frequently cleansed with salt solution; one teaspoonful of common salt dissolved in a pint of tepid water.

The patient should be under treatment for six or seven weeks, or until peeling is completed.

The case should, of course, come to the attention of a medical officer as soon as possible.

To relieve the pain of the sore throat apply the ice bag or cloths wrung out in cold water to the neck and have the patient gargle with Seiler's solution, dissolving four of the tablets in a pint of warm water or dissolve a half teaspoonful of soda bicarbonate in a tumbler of hot water and use as gargle. When the skin commences to peel, the patient may be rubbed with olive oil or a simple ointment to prevent the scales floating about, or a daily hot bath may be given.

The infection is most potent in the secretions of the nose and throat during the first five days of the disease.

#### SMALLPOX.

Incubation period, about 12 days.

Quarantine period, 14 days.

Isolation period, until every scab has disappeared—about 10 weeks.

Symptoms: The beginning is sudden, with a chill, headache, and pain in the back. The headache and backache are very severe and quite characteristic. The temperature rises rapidly to 103° or 104° F., and the patient may be delirious.

The eruption appears on the third day, on the forehead, scalp, forearms, trunk, and legs. At first the eruption consists of papules, which are small and red and feel like shot under the skin. On the sixth day the papules become vesicles; on the eighth, pustules; and

on the tenth scabs form, which in time fall off, leaving, finally, deep, white pitted scars. When the papules appear the temperature falls, but rises again when the pustules are forming. The patient's skin has usually a very foul odor.

There are four varieties of smallpox:

1. Modified smallpox, where the symptoms are less severe and the amount of rash smaller, owing to the patient having been vaccinated.

2. Discrete smallpox, where the pustules are scattered and do not run together.

3. Confluent smallpox, where the pustules run together and the symptoms are very severe.

4. Malignant smallpox, where, in addition to the ordinary symptoms, hemorrhages occur under the skin, or from the bowels, lungs, kidneys, or bladder. This variety is fatal in a day or two.

Treatment: The body must be sponged over twice daily, or warm baths given when the patient is strong enough. The mouth must be kept clean and the eyes washed with boric-acid solution. The eruption is usually covered with some oily dressing, such as vaseline or carbolized oil, or with cold-water compresses covered with oiled silk or muslin. A mask is made to cover the face and the eyes protected from the light. An arrangement to relieve the patient of the weight of bedclothes will become necessary. Feeding may become difficult, owing to the condition of the mouth. Delirium is common, and the patient must be carefully watched. Treat the patient along the general lines under that heading. Report the suspected case by wireless if possible.

#### MEASLES.

Incubation period, 7 to 14 days or longer.

Quarantine period, 16 days.

Isolation period, 21 days from appearance of the rash.

Symptoms: The disease commences like a common cold, with sneezing, running at the eyes and nose, headache, cough, and slight fever. On the fourth day the rash appears on the face, and thence spreads downward to the neck, chest, abdomen, and limbs. It consists of dull, red macules, which run together, forming various patterns, and lasts about three days. The lining of the mouth and throat appears of the same bright red color, dotted by minute white spots, which condition is diagnostic of measles. The temperature falls at the end of the fifth day and the symptoms disappear, but the cough may remain for some time.

Treatment: On general lines. Guard against chilling, as the complications, bronchitis and pneumonia, may prove fatal.

## GERMAN MEASLES.

Incubation period, 7 to 18 days.

Quarantine period, 20 days.

Isolation period, 10 days from the appearance of the rash.

Symptoms: These are usually very mild, consisting of sore throat, headache, very mild fever, lasting only a day or two, and enlargement of the glands of the neck. The rash appears on the third or fourth day on the face and chest, spreading to the trunk and limbs. It consists of red papules larger and duller than in scarlet fever, smaller and brighter than in measles, and last about two days.

Beyond keeping the patient isolated for a few days and avoiding a chill, no treatment is usually necessary.

## TYPHUS FEVER.

Incubation period, 5 to 12 days.

Quarantine period, 12 days.

Isolation period, 4 weeks.

This disease is transmitted from a person infected with the disease to the well by the body louse: therefore the presence of lice on board a ship is a great menace to the health of the crew; no lice, no typhus.

Symptoms: These come on suddenly with headache, shivering, vomiting, and a rapid rise of temperature to 104° or 105° F.

The rash appears on the fifth day on the trunk and limbs, but not on the face. It consists of dull-red mottling of the skin with small hemorrhages like fleabites, and has been called the "mulberry" rash.

It lasts about two weeks.

Great prostration is a marked symptom, and delirium is common.

The fever ends by crisis usually on the thirteenth day.

Treatment: On general lines. An abundance of fresh air is essential. Thoroughly examine the rest of the crew to ascertain the presence of lice. If found, immediately burn all clothing infested. Hair of the head and body should be shaved, the hair thus collected burned immediately. The body should be thoroughly washed, and the water thus used immediately thrown overboard. In short, use every means to get rid of lice.

## TYPHOID FEVER.

Incubation period, 1 to 3 weeks.

Quarantine period is not observed.

This important disease is now very rare in the naval service because of antityphoid inoculation used throughout the Navy.

The germ of the disease enters the body through the mouth in infected foods or drinks, of which water and milk are the commonest, and, after that, food contaminated by flies, thus showing the importance of protecting all foods, both cooked and uncooked, from flies.

Symptoms: These come on very gradually with loss of appetite, general indisposition, and headache: there may be also some cough, diarrhea, and bleeding from the nose.

It is a disease in which the fever lasts about four weeks. During the first week the temperature gradually rises until the beginning of the second week, when it reaches its height, and then continues until about the end of the third week, when it gradually begins to fall, ending by lysis at the end of the fourth week.

The rash appears on the seventh day on the abdomen, back, and lower part of the chest. It consists of fairly large, raised rose-spots, which fade on pressure. They are usually few in number and come out in crops. Each spot lasts about four days and the rash lasts about 14 days. As the fever progresses the patient becomes very weak; he loses flesh; his cheeks are slightly flushed; he is drowsy; and he is not capable of any exertion. He suffers from thirst: unless carefully attended, his lips and teeth become covered with scabs and crusts. Delirium is common.

Treatment along general lines: The patient needs careful nursing and should be removed to a hospital at the very first opportunity. When the fever is high, sponge baths should be given both night and morning, or oftener if necessary. Careful feeding is quite necessary in the treatment of typhoid fever, and the diet should consist principally of milk, although soft-boiled eggs, well-baked potato with a little butter and salt, broths and puddings, and a few crackers may be added. Food should be given a little at a time and at frequent intervals—two or three hours.

Drugs are of little use. The patient must be carefully watched and all his wants given attention. Diarrhea is rather common at first. Later on if there is constipation move bowels by enemata, not by cathartics.

#### MUMPS.

This is an infectious disease characterized by swelling of one or more of the salivary glands, usually the parotid—the one at the side of the jaw.

Incubation, 10 to 22 days.

Quarantine period, 24 days.

Isolation period, three weeks, but one week must have elapsed since all swelling has subsided.

Symptoms: The patient complains of pain and stiffness on moving the lower jaw, and there will be swelling of one or more of the salivary glands. His temperature is raised often to 104° F. The fever lasts about a week and the swelling about 10 days.

Treatment: On general lines. Isolate; keep the bowels well open, and for the pain hot-water bags may be used, applied to the swelling.

Complications: Orchitis, or inflammation of the testicles, is very liable to occur at the end of the first week. The temperature rises rapidly, and the testicle is found to be painful, tender, and swollen. This condition does not usually last more than a week. The testicles should be supported by a suspensory bandage or a broad strip of adhesive plaster, with gauze or cotton between testicles and support, applied across the upper part of the thighs in such a manner that the testicles will be thoroughly supported. The ice bag should be applied to relieve the pain and the bowels freely opened with Epsom salts—two tablespoonfuls dissolved in water.

#### DIPHThERIA.

This is an infectious disease characterized by the formation of a membrane in the throat and on the tonsils and soft palate. It is caused by the diphtheria bacillus; all secretions from the nose and mouth are infectious.

Incubation period, 2 to 10 days. Quarantine period, 12 days. Isolation period, until seen by medical officer and discharged.

Symptoms: These come on gradually, with general indisposition, sore throat, headache, enlarged glands in neck, and moderate fever. There is a creamy-white deposit formed on the tonsils, which spreads to the uvula and soft palate. This membrane may form on other adjacent parts and block the breathing tubes, in which case there is great danger of asphyxia. In addition to the symptoms caused by blocking of the air passages by the formation of the membrane, the patient suffers greatly from an overwhelming intoxication due to the formation of the poison by the diphtheria bacillus located in the membrane.

Treatment: Along general lines until the case can be seen by a medical officer. Keep the patient closely isolated and the throat clean by frequent gargling with warm Seiler's solution—four tablets dissolved in 1 pint of water, or with the soda bicarbonate solution described under scarlet fever. All secretions from the nose and mouth are very infectious, and these should be particularly taken care of. The attendant may become infected by the patient coughing in his face. To prevent this kind of infection, the attendant should at once wash his mouth out with Seiler's solution and bathe his eyes with boric-acid solution.

## INFLUENZA (GRIP).

This disease is due to a definite germ and is highly contagious.

Incubation period, 1 to 6 days.

The onset is fairly sudden with fever and signs of a bad cold, but the patient feels much more ill than with ordinary colds, and has severe pains in the back, limbs, and head. In some forms the lungs are mostly affected and pneumonia or bronchitis may complicate the disease. In others the heart may suffer, causing palpitation and difficult breathing; while in others, again, diarrhea and vomiting may be the chief symptoms. The acute illness lasts about a week, but convalescence may be very prolonged and complicated.

Treatment: On general lines. In the beginning of the disease open the bowels well with a dose of castor oil—two tablespoonfuls. After this has acted give 10 grains of Dover's powder at night. If the headache and pains in the limbs and back continue and are severe give aspirin, 5 grains every three hours. Do not continue this treatment more than two days, as aspirin depresses the heart.

## MALARIAL FEVER (CHILLS AND FEVER).

This is a recurrent fever caused by the malarial parasite which is carried by a mosquito, and which enters the body when the insect bites. The disease is not infectious except through the bite of a mosquito which has bitten fever cases at some time during its life.

Symptoms: The disease consists in attacks of fever which recur at regular intervals. Each attack may be divided into three stages:

1. The cold stage: The patient shivers and feels cold when his temperature is rapidly rising. He goes to bed and covers himself with extra blankets. This stage lasts about half an hour.

2. The hot stage: He begins to feel warm and removes most of the bedclothes. The skin feels hot and dry, and he suffers from severe headache. The temperature will now be 105° F. or higher. This stage lasts three or four hours.

3. The sweating stage: During this stage the patient perspires freely, the headache and flush disappear, and the temperature returns to normal. This stage lasts about two hours.

These attacks occur every day, every other day, or every third day, according to the form of malarial parasite, and each lasts about six hours. There are other types of malaria in which the fever is continuous, and somewhat resembles the fever of typhoid. Frequently this type of malaria can be diagnosed only by the aid of a microscope, and therefore requires the attention of a medical officer.

Treatment: During the attack, treat along general lines. The only drug which has any effect is quinine, which can be given by mouth,

in capsules of 5 grains every two hours, or as 3-grain tablets, taking two, three times a day.

Prevention: The malarial mosquito bites preferably at dusk or at night, therefore when in malarial countries everyone should sleep under mosquito nets. A dose of quinine, 5 grains every third day, tends to prevent the disease and should be given when in ports where malaria is prevalent.

#### YELLOW FEVER.

An important epidemic disease of the West Coast of Africa, of South America, Central America, and the West Indies. The virus is contained in the blood of infected patients only during the first three days of the disease, and the disease is transmitted by the bite of a mosquito, *Stegomyia calopus*. As it is important to be able to recognize the mosquito, a brief description of it follows: The insect is almost black and has white bands on its back resembling a lyre or jew's-harp, and the legs also have white bands. If deprived of water, the adult insect only lives about five days. It is essentially a house mosquito and rarely travels more than 75 feet from the house where it has been feeding, and it is probable that it is brought aboard ships in connection with coaling or provisioning rather than blown aboard by prevailing winds.

When a susceptible individual is bitten by an infected mosquito there develops, after a period of incubation of from two to five days, a rapid rise of fever, with marked congestion of the face and severe pains of the back and head. Vomiting first of mucus and bile comes on very early. The temperature remains fairly high for three or four days, but notwithstanding the high temperature the pulse rate becomes less, and by the third or fourth day will have decreased by 20 to 40 beats from its initial rate. This is a very important symptom. On the fourth day the temperature falls and the face loses its congested appearance, and it is now that the most characteristic feature of yellow fever appears—namely, jaundice. Vomiting of material resembling coffee grounds is common.

Prevention: By screening a patient during the first three days of the disease to prevent infection. Any receptacle, tank, double bottom, or other place where fresh water may be collected should be thoroughly screened and frequently inspected in order to prevent the breeding of mosquitoes.

Treatment: During the first three days of the disease no nourishment whatever should be given. The patient should be allowed an abundance of fluid, of which the best is vichy or soda water, unflavored, giving a couple of ounces every 10 minutes, iced or just cool, as the patient prefers. If vichy is not available, water, to which

has been added a teaspoonful of sodium bicarbonate (baking soda) to the quart, is a good substitute. It is of vital importance to put the patient to bed and keep him quiet. When vomiting is severe cracked ice may be of value.

A mustard foot bath should be given, the feet and legs of the recumbent patient being immersed in a foot tub half full of warm water in which a pound of ground mustard has been stirred. Every few minutes a quart of very hot water should be added, keeping the bath very hot, just short of burning the feet. The blankets are kept over the patient and foot tub, so that a vapor bath is also given, which produces sweating. This treatment relieves the head and backache and can be repeated two or three times in 24 hours. During the treatment, to make the patient sweat, apply cold to the head—wet cloths, ice bag, etc. After the bath the sweating patient should be thoroughly dried. Stimulants every three hours should be given if the patient shows signs of collapse.

#### DISEASES OF THE STOMACH AND INTESTINES.

*Colic*.—This is a term applied to abdominal pain occurring in paroxysms of varying degrees of severity. The pain is usually located in the region of the navel—that is, in the middle of the belly. Colic is often preceded by constipation and accompanied by vomiting.

The causes are various and the pain often may be a symptom of serious trouble. For example, abdominal pain is almost always the first and most pronounced symptom of appendicitis, gallstone, stone in the kidney, and the well-known cramps of lead poisoning (painters' colic).

Besides being a symptom of these conditions, colic is most frequently due to overeating, and when such is the case emptying the overloaded stomach generally gives prompt relief.

The very best treatment which can be used to relieve abdominal pain, no matter what may be the cause, is gastric lavage or washing out the stomach. This is usually accomplished by means of a soft-rubber stomach tube, but as this method requires considerable skill to be effective it is not advised except when done by a medical officer or a well-trained member of the Hospital Corps. However, the stomach may be safely, thoroughly, and effectively washed by the following simple means:

Make the patient drink as rapidly as possible five or six glasses of lukewarm water and then cause him to vomit by tickling the back of his throat with the finger or a feather. After this has been done the patient should be placed in bed and a hot-water bag applied to the abdomen, a cloth to be interposed between the bag and skin to protect the latter from being burned or blistered. No food or drink should be allowed until the colic has subsided, and if it returns the stomach

should again be washed out, following the procedure described above. An individual suffering with colic is vastly better off with nothing in the stomach, and such a person can easily go without food for five or six days, but must have water, which should be given in small amounts after the first 24 hours. If the patient's bowels have not moved during the past 24 hours, an enema (injection into the rectum), consisting of a pint of warm water and soapsuds, should be given, and repeated in half an hour if there has been no result from the other.

A mustard plaster, or cloths wrung out in hot water, may be applied to the belly. The patient is apt to be most comfortable lying on his side with the knees drawn up. In using hot applications the utmost care must be used not to burn the patient. In using mustard plasters it is to be remembered that some persons have very sensitive skin. Wet the mustard leaf in cold water and lay a piece of gauze or layer of a pocket handkerchief between mustard and skin; otherwise the application should be very brief, a few moments at the most.

After all pain has subsided the patient may be given liquid or semi-solid foods, such as clear soups, custards, milk, milk toast, or soft-boiled eggs, and this diet may be cautiously and gradually increased to the use of solid foods as the pain and vomiting subside and do not return.

As the patient gradually gets over the acute symptoms and the pain, which at first was general, becomes localized, particularly as a tender spot in the right side of the abdomen, an ice bag should replace the hot-water bag and the patient be placed in an inclined position in bed, the incline being toward the feet.

It should be particularly noted and remembered that abdominal colic is only a *symptom*, and may indicate some very serious condition—appendicitis, for example—which can be relieved only by a surgical operation or other means which could only be applied by a skilled physician. However, if the treatment as given above is used, the unskilled person will be doing as much as any trained physician could do until the sufferer can be admitted to a hospital and come under the care of a surgeon. *Do not give cathartics.*

*Diarrhea.*—Diarrhea is understood as an abnormal frequency of the stools with a change in their character and consistency. Commonly it is an acute condition caused by some inflammation or irritation of the intestines. It is one of the main symptoms of typhoid fever, cholera, and dysentery.

It is simple diarrhea when it occurs independently of any appreciable disease. It may be caused by exposure to cold or by eating unripe and indigestible vegetables and fruits, or decomposed or im-

properly cooked meat, fish, and shellfish. Drinking large quantities of cold water when the body is overheated is a frequent cause.

The symptoms are frequent watery and straining stools accompanied by loss of appetite, nausea, and sometimes vomiting and abdominal cramps.

Treatment: In simple diarrhea first clear the intestines with a quick-acting purgative in order to get rid of its irritating contents; give castor oil—two tablespoonfuls—or two or three compound cathartic pills. After one or two actions of the bowels from the cathartic, favorable cases are usually checked; but if not, put the patient on a liquid or semisolid diet, keep him at rest, apply the hot-water bag to the abdomen, and give lead and opium pill (or Dover's powder, 5 grains) every four hours for three or four doses. While the diarrhea is acute, the less food taken the better.

*Dysentery.*—Dysentery, or bloody flux, as it is sometimes called, is an inflammation and ulceration of the large bowel caused by an infection.

It occurs in different degrees of severity and may be either acute or chronic. Its severest form is met with in tropical countries, where it frequently occurs in widespread epidemics and may attack a whole ship's company.

It is caused by specific microorganisms which enter the system with contaminated food or drink.

Symptoms: The disease may begin suddenly or gradually. The first stools may be like those of ordinary diarrhea, and after a day or two, or maybe a few hours, the stools contain slime and blood. Later they may become shreddy and brownish or greenish in color. The patient complains of cramps and "colicky" pains in the belly, with a burning sensation in the rectum, accompanied by a feeling as if something must be expelled, and a constant desire to go to stool. The number of bowel movements may be from 10 to 50 a day, or even 100, depending upon the severity of the case, but the quantity expelled with each movement may not exceed a teaspoonful.

Treatment: The patient should rest in bed, and if possible use the bedpan, so as to insure the greatest amount of rest, which is of greatest importance. Keep the patient warm, apply hot-water bag or cloths wrung out in very hot water to abdomen, and stop all solid food. In the tropical form of the disease ipecac, or its active principle emetin, acts as a specific, but it is required that it should be administered by skilled hands and is only mentioned here to impress the fact that a person suffering from dysentery should come under the care of a medical officer as soon as possible.

In countries where dysentery is prevalent no fruit or uncooked vegetables should be allowed, and all foods, both cooked and un-

cooked, should be protected from flies, which carry the contagion. Nothing but distilled or boiled water should be used for drinking or cooking purposes.

## DISEASES OF THE RESPIRATORY SYSTEM.

*Tonsillitis (sore throat).*—All cases of tonsillitis and sore throat should be promptly isolated because of the possibility of their being diphtheria, and the consequent probability of an epidemic of that disease should such be the case. Sore throat often accompanies a bad cold and is common where ventilation is imperfect. Patient complains of rawness and difficulty in swallowing and the tonsils are swollen and red. There are headaches, general muscular and joint pains, and the fever is often high. Small beads of yellow pus are seen on the red, swollen tonsils, and in some cases abscesses may form.

If there is a grayish-white tenacious membrane formed in the throat, which bleeds readily when touched, the case should be regarded as diphtheria and the individual promptly and completely isolated, and a medical officer consulted as soon as possible.

Treatment: Isolate all cases of sore throat. Rest in bed, open bowels freely with castor oil (two tablespoonfuls) or cathartic pills, make patient gargle every half hour with Seiler's solution (made by dissolving four of Seiler's tablets in a pint of warm water) or by gargling with one-half teaspoonful soda bicarbonate dissolved in tumbler of hot water. Apply ice bag to the neck, or cold cloths if an ice bag is not available. Give liquid and soft diet; avoid hot and highly seasoned food which will burn and irritate an already inflamed throat.

As rheumatism of the joints is a frequent sequel of tonsillitis it is well to give antirheumatic medication during and for about a week after the attack. Sodium salicylate (gr. 10), three times a day after food, should be administered, or if this is not available a pinch of soda bicarbonate in one-half teacupful of water four times a day.

*Coughs and colds.*—When a person has a cough that lasts more than two weeks, even though the symptoms are mild, the case is serious enough to require an examination by medical officer, which should be done at the first opportunity. A cold often marks the beginning of an acute infectious disease, such as measles, scarlet fever, etc.

A case of bronchitis or bad cold usually begins with a cough, sometimes starting with an irritation in the throat, which gradually travels down into the lungs. The cough is at first usually dry, but later there is a free discharge from the nose and the cough becomes loose and considerable mucus is raised from the lungs. This sputum

may at first be white and later yellowish. With this there will be soreness over the upper and front part of the chest, and if the cough is violent there will be considerable soreness of the muscles between the ribs.

Treatment: Colds may often be headed off, certainly benefited, if at the beginning the patient's bowels are freely opened with castor oil, Epsom salts, or cathartic pills, and after either of these has acted he is given a hot bath, put to bed, receives a drink of hot lemonade, and is covered with blankets until a good perspiration is induced. While in this condition care should be taken not to get the body chilled and make the cold worse. Dover's powder, 10 grains should be taken on going to bed.

#### DELIRIUM TREMENS.

Delirium tremens occurs as an incident in the life of persons addicted to the excessive use of intoxicating liquors.

Loss of appetite, sleeplessness, or a marked mental depression are the chief symptoms of the first stage of the affliction known among drunkards as "the horrors."

As the disease advances the patient talks incoherently, has a wild expression, his mind wanders from one thing to another. He answers questions in a rambling manner and fancies he is being pursued by wild animals, or that he sees rats, snakes, and other animals crawling on the walls around his bed. The delirium is always worse at night, but *the patient requires watching at all times*, for he may try to jump overboard or commit suicide in some other way.

Delirium tremens may be confounded with delirium of acute fevers. Pneumonia is a frequent complication of delirium tremens and in fatal cases may be the direct cause of death. It may, in drunkards, follow a fracture or other injury.

Treatment: The patient requires constant attendance. In all cases the symptoms are aggravated by the lack of food, which the patient has been either unable or unwilling to take. Careful feeding is of the utmost importance. Thick, nourishing soup constitutes the best food in this condition and should be given every two hours, and the patient encouraged in every way to take food. Until a medical officer can assume charge of the case whisky should not be withheld, but should be given in gradually diminishing quantities—1 or 2 ounces every two hours, especially if the pulse is weak. Give beef extract hot. This and the soups are rendered more effective and palatable by addition of pepper as seasoning.

The serious symptoms are largely due to sleeplessness, and if several hours of sound sleep can be produced improvement is almost sure to follow. To this end trional in 15-grain doses should be given

in water every three hours. Sometimes by wrapping the patient in a sheet and blankets wrung out in very hot water and at the same time applying cold to the head a sedative or quieting effect is produced and the patient gets rest even if no sleep.

## SUNSTROKE.

Sunstroke is an attack of illness caused by exposure to the rays of the sun: but the same condition may be produced in hot weather by exposure to high temperatures not in the direct rays of the sun, particularly if the person is engaged at hard work in close quarters. Coal passers and firemen are sometimes affected by the heat of the furnace. *Men debilitated from or addicted to the excessive use of stimulants are more apt to suffer than those of temperate habits.*

Sunstroke occurs in two forms—heat stroke (heat fever), in which the temperature of the body is very high, and heat prostration or heat exhaustion, in which the surface of the body is cool. The difference is very important because of the different treatment required.

In severe cases of heat stroke the person may be stricken down and die in a few hours. In other cases there may be intense headache, dizziness, marked restlessness, nausea and vomiting, and hot, burning skin. The clinical thermometer may register  $105^{\circ}$  F. Pulse is strong and may be slow or fast and breathing difficult. The patient soon becomes unconscious, and if left untreated the unconsciousness deepens and death may follow within 24 hours.

In heat prostration the surface of the body is cool, the pulse weak and rapid, and the patient feels exhausted. There may be only slight nausea and vomiting, and under treatment the patient may rapidly recover; or, on the other hand, there may be complete loss of consciousness and a rapid and fatal termination from exhaustion. This prostration is often accompanied by muscular cramps, particularly in persons who have been doing hard work while exposed to high temperatures. These cramps are extremely painful, and the attacks may last from 12 to 24 hours. The muscles may remain sore and the patient weak and listless for several days after the seizure, although the attacks vary from a slight cramp in the abdomen or limbs to general cramps in all the muscles.

Treatment: In heat stroke (heat fever) the temperature of the body should be reduced as rapidly as possible. Place the patient in a tub of cold water, add ice, and rub the body briskly with the hands, keep an ice bag to the head, and continue the treatment until the temperature is reduced to  $100^{\circ}$  F., as shown by the thermometer inserted in the rectum.

In heat prostration, with cool skin, stimulate the patient and rub his body and limbs. Hot rich soup given with the patient at rest

in bed has proven very useful in this condition. It is necessary that the soup should be hot; and even when there has been vomiting administering hot soup has both stimulated the patient and stopped the vomiting. This should be repeated as soon as the patient feels at all hungry, and in the meantime hot tea should be given. In the more severe cases hot food and drink will not suffice, and then the patient should be given stimulants (aromatic spirits of ammonia), kept warm by blankets and hot-water bags, and a mustard plaster placed on the abdomen; and if the cramps are severe the muscles should be vigorously rubbed.

#### HEADACHE.

Headache is a symptom of disease of some part of the body. It generally accompanies the acute fevers, is associated with constipation, disorders of the stomach, liver, kidneys, and genital organs. Eye strain is a frequent cause.

Treatment: Remove the cause if possible. Open the bowels with a dose of castor oil or salts, and give 10 grains of aspirin and repeat in three hours if necessary. A little hot tea and toast should be given with this medicine to prevent nausea. A medical officer should be consulted if this does not benefit the patient.

#### DISEASES OF THE EYE.

*Stye.*—A stye is a pustule which forms on the margin of the eyelid around an eyelash. The lid is inflamed, painful, and has the general appearance of a small boil.

Treatment: Pain may be relieved by applying squares of gauze wrung out of hot boric-acid solution. When the stye ruptures, keep the lid clean with frequent washings with boric-acid solution in order to prevent recurrence of more styes.

*Inflammation of the eye.*—In all inflammations of the eye ascertain at once if the individual has the clap. If he has, the chances are that you are dealing with a very severe condition, which should be brought to the attention of a medical officer immediately.

*Simple inflammation of the eye.*—This is caused by irritation, such as exposure to the wind or dust, by foreign bodies in the eye, and frequently by the fumes of turpentine contained in paint used in confined places, as when painting double bottoms, etc.

Symptoms: The eye is bloodshot and watery, the patient complains of pain, the sensation of sand in the eye, and heat. A thin watery discharge appears, which tends to stick the lids together.

Treatment: Turn back the upper lid, pull down lower lid, remove all small particles of dust and dirt by gently wiping the lid with cotton loosely wound about a match stem. To turn back the upper

lid lay a match stem lengthwise along the middle of the lid, press down gently and at the same time pull up on the lashes. Have the patient look in all directions, for by this means particles of irritating matter which do not at first appear may be brought to view. After having removed all the irritating particles, wash the eye with warm solution of boric acid, using a small piece of cotton saturated with this solution held very closely to the inner angle of the eye. Do not drop solution on the eye.

*Gonorrheal inflammation of the eye.*—This is usually found in patients who have the clap and is caused by the individual rubbing or touching his eye after handling the penis and not having washed his hands. The inflammation is very rapid and very severe. The lids are swollen as are the inner parts of the eye, and thick pus soon begins to discharge.

Treatment: The sound eye should at once be protected by a shield consisting of a watch-glass crystal fixed over the eye with adhesive plaster. The infected eye should then be washed frequently with boric-acid solution, and a little vaseline applied to the edges of the lids so they will not stick together and retain the pus. Cold applications should then be applied to the infected eye, and this may be done by placing small pieces of cloth on a cake of ice and transferring them to the eye, making the changes frequently.

In all cases of inflammation in the eye the patient should be kept in a dark place, or the eye protected from the light by a shield.

#### EARACHE.

Earache is due to so many different causes that a medical officer should be consulted as soon as possible. To relieve pain apply hot-water bag, move bowels freely with two tablespoonfuls of castor oil, and, if pain continues and is very severe, give Dover's powder (5 grains) two or three times at intervals of four hours.

#### TOOTHACHE.

Usually due to a decayed and hollow tooth. Remove particles of food from the cavity and plug with a small piece of cotton saturated with oil of cloves, and over this place a small piece of dry cotton so as to protect the tongue and mouth from the irritant effect of the oil of cloves. Apply the hot-water bag, and if necessary give Dover's powder (5 grains) two or three times at intervals of four hours.

#### THE ITCH (SCABIES).

This is an itching disease (known as the seven-years' itch, etc.) found among people living in uncleanly surroundings and habits.

The cause of scabies is the itch mite. It is therefore a contagious disease and may be passed from one to the other by close contact. The itch mite travels from one patient to another through the medium of the clothing, the towels, the bed clothing, personal articles, etc. The most common way of passing the disease from one to another is in having two or more persons using the same bed and same clothing.

Treatment: The treatment should be carried out in the following way until the disease is eradicated: Upon going to bed at night the patient takes a hot bath with plenty of soap. The surface of the skin is thoroughly scrubbed, particularly in the vicinity of the eruption. Following this bath an ointment, consisting of sulphur and lard, commonly known as the official sulphur ointment, in the proportions of about 1 teaspoonful of sulphur to one ounce of lard, is now rubbed thoroughly into the skin from the collar bone entirely over the body to the soles of the feet, particularly in the vicinity of the eruption between the fingers, between the toes, and in the folds. There is no occasion to apply the ointment above the collar bone, as the disease seldom attacks that portion of the body. The patient should now put on clean night clothing, and the bed linen on his bunk should also be changed to clean linen and blankets. The next morning the patient takes another soap and water bath and puts on fresh, clean underclothing which has not been worn since laundered. The next night the patient goes through the same performance. He takes a hot bath with soap and water, applies the ointment, and wears the same clothing and sleeps in the same bed as on the previous night. The next morning he takes another hot water and soap bath and puts on either clean clothing or the clothing he has worn the day before. This application of hot water and soap baths and sulphur ointment is carried out for three or four nights, and then freshly laundered clothing is put on, following a most thorough soap and water bath. The bed clothing is again changed, so that upon retiring at night he sleeps in a fresh bed. The patient should continue to take a hot soap and water bath daily for several days in order to remove the ointment and sulphur from the skin, and also the effects of the disease. After a few days have elapsed, if there is no return of the eruption and the itching is subsiding, the patient has probably been cured of the condition. Should, however, the eruption continue and the itching remain unabated, a second series of treatments as described above should be gone through with. Too long an application, however, of these treatments is not advisable, as the sulphur tends to cause an irritation of the skin which may cover up the scabies. If the skin gets very rough and generally red from irritation, limit treatment to anointing the body with vaseline or zinc ointment.

## LICE (VERMIN).

There are three forms of lice, which vary in size and somewhat in appearance.

The condition is contagious, as these parasites can be conveyed from one person to another through the medium of comb and brush, using the same bed and sleeping clothes, the use of the same outer garments, the presence of the vermin within the quarters inhabited by all the crew, and in other ways.

The general appearance of the skin is caused largely by scratch marks induced by the parasites. The main symptom is that of itching.

*The scalp.*—Little lumps are seen along the shafts and at the ends of the hairs. These are the nits or eggs of the parasite. The most effective way of curing the condition is to shave the scalp closely. If this is not practicable, the hair should be cut short. Then tie up the head in a towel after rubbing equal parts of vinegar and crude petroleum (coal oil) thoroughly into the scalp and wetting the hair therewith. Be sure to caution the patient about the danger of fire when the hair is saturated with petroleum. The petroleum should remain on for about half an hour. Then scrub the scalp with soap and water, and comb with a fine-tooth comb wet with vinegar.

*The genitals.*—The louse which lives in the hair around the genitals is a small, round parasite commonly known as the crab louse. It deposits nits upon the hair, as does the louse of the scalp. The entire area, including the inner side of the thighs, should be shaved in order to remove all nits. This treatment may be combined with the use of mercurial ointment commonly known as "blue butter." The use of this ointment does little good unless the nits are removed.

*The body.*—The body louse is the largest of the three varieties. It inhabits the clothing of the patient and usually seeks the seams of garments. The treatment consists of changing the entire outer and under clothing after taking a bath and scrubbing the person thoroughly with a liquid soap. Infected clothing should be boiled or, if this is not practicable, immersed in bichloride solution for several hours. The patient's mattress cover and blankets should likewise be disinfected.

## CHAPTER IV.

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### HOSPITAL FACILITIES.

Officers and men of the naval service are entitled to treatment in naval hospitals and on naval hospital ships. (R. 1142.) By arrangements between the Navy and Treasury Departments they will also receive treatment in hospitals of the United States Public Health Service, and will be allowed treatment in civil hospitals when naval and public health hospitals are not accessible.

Naval hospitals to which patients from the naval service may be admitted are located as follows: Portsmouth, N. H.; Chelsea, Mass.; Narragansett Bay, R. I. (Newport); New York, N. Y. (Brooklyn); Philadelphia, Pa. (navy yard); Washington, D. C.; Annapolis, Md.; Norfolk (Portsmouth, Va.); Charleston, S. C.; Parris Island, S. C.; Pensacola, Fla.; Key West, Fla.; Great Lakes, Ill.; San Diego, Calif.; Mare Island, Calif.; Puget Sound, Wash.; Pearl Harbor, Hawaii; Canacao, P. I.; Guam; St. Thomas, Virgin Islands.

Members of the naval service in need of hospital treatment should always be transferred to a naval hospital if convenient to the ship. If there is no naval hospital convenient transfer should be made to a Public Health Service hospital or one of its contract stations. The public health officer of the port, if present, should be consulted regarding hospital facilities, and admission of the patient should be made with his approval and under his directions. A list of the Public Health Service hospitals as well as its contract stations will be found in the annual circular, *Contracts for the Care of Seamen*, etc., issued by the Public Health Service. The following is an extract from the Regulations of the Public Health Service bearing on its care and treatment as patients of officers and crews of naval vessels:

Officers and enlisted men of the United States Army and Navy may be admitted for care and treatment as patients of the service only upon the written request of their respective commanding officers. Every such admission shall be immediately reported to the Surgeon General by the officer in charge of the station, on a daily report (Form 1957) or relief certificate (Form 1916), accompanied by a copy of the request upon which such officer or man was admitted. They will be furnished treatment at stations of the first, second, and third class only. The rate of charge to be made for the care and treatment of the said officers and men will be fixed by the department at the beginning of each fiscal year, and will be announced to officers

and others in the annual circular entitled "Contracts for Care of Seamen." Patients of the above-named classes are not subject to the provision requiring transportation to marine hospitals.

United States Public Health Service hospitals to which naval patients may be admitted are located as follows: Baltimore, Md.; Boston, Mass.; Buffalo, N. Y.; Cape Fear Quarantine Station; Chicago, Ill.; Cleveland, Ohio; Delaware Breakwater, Del.; Detroit, Mich.; Evansville, Ind.; Fort Stanton, N. Mex.; Gulfport, Miss.; Key West, Fla.; Louisville, Ky.; Memphis, Tenn.; Mobile, Ala.; New Orleans, La.; New York, N. Y.; Portland, Me.; Port Townsend, Wash.; St. Louis, Mo.; San Francisco, Calif.; Savannah, Ga.; Vineyard Haven, Mass. In addition to the foregoing there are a large number of contract hospitals under the Public Health Service referred to in paragraph 3 the location of which may be ascertained from the annual circular, Contracts for the Care of Seamen, and which are not listed herein because of changes made in the contracts from year to year.

Expenses occurring in connection with the treatment of men as patients of the Public Health Service are adjusted by transfer of appropriations between the Bureau of Medicine and Surgery and the Public Health Service, and no payment by the commanding officer of the ship is therefore required. In emergency, and when none of the hospitals mentioned above are available, a patient may be transferred to a civil hospital ashore as provided for in Navy Regulations. (R. 1143, 1187, 1203.)

Due to the uncertainty of the movements of vessels of the auxiliary service, whenever an officer or man of the service is transferred to a hospital for treatment, his personal effects shall be sent with him.

It is intended and desired that commanding officers of naval vessels to which no member of the Medical Department of the Navy is attached consult freely with medical and dental officers of the Navy, whenever opportunity offers, both ashore and afloat, regarding the care and treatment of the sick, as well as the general health of the crew and the sanitation of the ship. If urgent the medicine box of the ship may be replenished from medical stores of a yard, station, or ship. The medical and dental officer of a yard or station will be found at the dispensary, where, with the approval of the commandant, assistance and advice in the treatment and care of the sick may be received.

## CHAPTER V.

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### DEATHS.

The commanding officer shall cause to be entered in the log book the name and rank or rating of any person who may die on board, with a statement as to the exact time and cause of death.

When death occurs while the ship is at a port within the continental limits of the United States, he shall report the same to the Secretary of the Navy by dispatch, giving the full name, rank or rating, and service number, date, and cause of death, stating whether or not the next of kin has been notified and what disposition has been made of the body. In such cases he shall also inform (by dispatch) the nearest relative or legal representative of the deceased (unless living outside of the continental limits of the United States) and request him to communicate by telegram with the Bureau of Medicine and Surgery, Navy Department, Washington, D. C., regarding the desired disposition of the remains. If practicable, the body shall be transferred immediately to the nearest naval hospital or to the medical department of the nearest navy yard or station for embalming, preparation, and retention for such further disposition as may be directed by the Bureau of Medicine and Surgery. Otherwise the body shall be placed in the care of a civilian undertaker, to be embalmed and retained until directions for disposition are received.

When death occurs at sea or in a port outside the continental limits of the United States he shall *not* notify the next of kin, but shall make report by dispatch to the Secretary of the Navy, giving the full name, rank or rating, and service number, date, and cause of death, name and address of next of kin, and state whether or not it is possible to retain the body for preparation and shipment. If more than 24 hours must elapse from time of death until the vessel can reach port, burial at sea probably will be necessary. Whenever practicable, however, the remains will be retained for embalming and awaiting receipt of instructions from the Bureau of Medicine and Surgery as to disposition. Burials at sea or in a foreign port shall be made only when preservation or retention of the body is *impossible*, which fact will be reported by dispatch as noted above.

When burial is necessarily made in a foreign country, the health regulations as to disinterment shall be ascertained and reported by

letter to the Bureau of Medicine and Surgery, together with information as to date, place, and other circumstances of burial.

Whenever the services of a civilian undertaker are required, arrangements will be made to limit the expenses to the lowest amount consistent with decent preparation and encasement in accordance with Navy Regulations, or to meet the requirements of laws governing transportation. In such cases, the expenses of preparation and encasement will be paid by public bill approved by the commanding officer. When practicable, such bills will be further submitted to the Bureau of Medicine and Surgery for approval prior to payment.

Expenses incident to burial are a charge against the appropriation "Contingent, Bureau of Medicine and Surgery"; those incident to transportation against "Bringing home remains of officers, etc., Navy Department."

The funeral expenses of an officer who dies and is buried in a foreign country are limited by Navy Regulations to an amount not in excess of one month's pay. In the United States the expenses may not exceed \$150.

In the case of enlisted men of the Navy and Marine Corps who die and are buried elsewhere than within the United States, the amounts paid for funeral expenses, including preparation, encasement, and interment of remains, shall not exceed \$50 each, unless due regard for decent burial renders greater expense necessary, which fact must be certified on all copies of the public bill by the officer ordering the payment of the bill. In the United States no specific limit has been set, but expenses will be held to actual necessities.

The remains of naval dead shall be prepared for interment or for shipment to their homes under the supervision of an officer who shall determine by final inspection in each instance that the work of embalming, cleansing, shaving, and dressing have been competently performed, and that the encasement, clothing, etc., meet all the requirements of the occasion.

Each body shall be dressed in a clean, presentable, and complete (except for cap and shoes) uniform of the proper rank or rating. A cap may be placed inside of the casket. When a body is sent to a hospital or hospital ship for embalming and further disposition, suitable uniform for burial shall be sent with it.

Where available clothing belonging to a deceased enlisted man is not sufficient in quantity or of proper kind or quality, or is too much worn, new clothing (outer and under) shall be obtained as may be necessary from the supply department and charged to the appropriation "Contingent, Medicine and Surgery."

Transportation, when authorized by the Bureau of Medicine and Surgery, shall be effected either on two first-class tickets or by

express on Government bill of lading. One copy of the bill of lading, on which transportation of remains of the dead is effected, shall be securely pasted on top of the shipping casket with a dextrin paste, similar to that used by the express company, and then covered with shellac or varnish. If Government bills of lading are not available, the civilian undertaker should include transportation charges in his bill, submitting receipts from the transportation company. Under no circumstances should a body be sent "collect."

The next of kin, family, legal representative of the deceased, or the consignee, should the body be sent to other than the preceding, shall be informed by telegram of the time of forwarding and of any special attending circumstances, such as communicable disease and the advisability or inadvisability of opening the casket for the purpose of viewing the remains. One copy of the bill of lading should be promptly forwarded to the consignee under special-delivery stamp and accompanied by an explanatory memorandum.

When relatives of the deceased are present and desire to accompany the remains to destination, transportation may be effected on two first-class tickets (Government transportation request) and one delivered to the relative to cover his transportation. Pullman or sleeping-car accommodations for such escort will not be furnished.

When an officer or enlisted man of the Navy or Marine Corps dies where the services of a medical officer of the Navy were not available, a report of the death shall be requested from the physician who attended such person. This report shall be forwarded to the Bureau of Medicine and Surgery and, upon its receipt, a report of death (Form N) will be prepared and signed by the Surgeon General of the Navy.

The commanding officer shall, upon the death of any person on board the ship under his command, cause all of the effects of the deceased to be collected and inventoried. If the deceased was an officer, this shall be done by two officers of the ship; if a member of the crew or other person, by the officer of his division or one detailed for the purpose. The inventories shall be made out in duplicate, duly attested and signed by the officers making them. Upon the completion of the inventory the effects, if not of a perishable nature, shall be put up in packages of convenient size and sealed with the seal of the ship. The commanding officer shall retain one copy of the inventory himself, and shall deliver the other to the supply officer, who shall also take charge of the effects for safekeeping.

If any of the effects of a deceased person are perishable and deteriorating they shall be immediately sold at auction, the proceeds of which shall be disposed of in the same manner as other money found in his effects.

All moneys, articles of value, papers, keepsakes, and other similar effects shall be forwarded to the legal representative or, in default of such, the heirs at law of the deceased. Should it be impossible to ascertain the existence of the legal representative or of heirs at law, the moneys and articles mentioned and other similar effects shall be sent to the Chief of the Bureau of Navigation or to the Major General Commandant of the Marine Corps, as the case may be, for safe-keeping. Should the above-described property be unclaimed for a period of two years after the death of the owner thereof, all articles and effects so deposited shall be sold at auction to the highest bidder, and the proceeds of such sale, together with the moneys above mentioned, shall be deposited in the Treasury to the credit of the Navy pension fund.

If at any time during the two years such above-described property is in the custody of naval authorities the executor or legal representative of the deceased person shall apply for his effects, all shall be delivered to him.

The commanding officer shall exercise his discretion in causing the effects of deceased enlisted men to be sold at auction at the mast, or retaining them for transmission to the heirs, relatives, or friends. In exercising this discretion he shall be governed by the wishes of the heirs, relatives, or friends, if possible to learn them before closing the accounts of the deceased.

He shall cause the accounts of all deceased persons to be closed as soon as possible and forwarded to the Military Division, General Accounting Office, Washington, D. C., together with the will, if any can be found. These accounts must be examined and approved by the commanding officer.

Immediately upon official notification of the death, from wounds or disease not the result of his own misconduct, of any officer or enlisted man on the active list of the Navy and Marine Corps, the Paymaster General of the Navy shall cause to be paid to the widow, and, if no widow, to the children, and if there be no children to any other dependent relative of such officer or enlisted man previously designated by him, an amount equal to six months' pay at the rate received by such officer or enlisted man at the date of his death.

## CHAPTER VI.

### QUARANTINE AND DISINFECTION.

#### QUARANTINE.

The term "quarantine" has its origin from the Italian "quaranta," meaning 40, this figure representing the number of days for which vessels, beginning early in the fifteenth century, were held under observation on account of the frequent invasions of plague.

The term now means any limitation placed upon the freedom or movement of persons or animals with the object of preventing or controlling the spread of communicable disease. The expression "quarantine methods" is often used to cover all restrictive measures instituted by health officials for the purpose of limiting the spread of disease on land as well as at sea. We have community quarantine when one city or town imposes restrictions upon travelers from some other place in the same country, and border quarantine when the aim is to prevent the introduction of disease over land or across a river from a foreign country. Interstate quarantine is enforced by the Federal Government through the agency of the United States Public Health Service, and consists of routine and special activities planned to limit the spread of disease incident to interstate travel and traffic.

Maritime quarantine includes all measures undertaken by the Government to prevent the introduction of disease through sea-ports.

The first quarantine station established—that at Venice in 1403, on a small island adjoining the city—differed in its basic idea from those stations now protecting the ports of New York, Hamburg, or London, in the blind application of the theory of isolation, as compared with the scientific and accurate periods of detention now in use to prevent the ingress of certain threatened diseases. From the earliest days until the determination of the exact modes of transmission and periods of incubation of the quarantinable diseases, quarantine consisted in more or less rigorous periods of detention, even up to 100 days, with the expectation that in this time the disease, if present, would "wear itself out," or that the "effluvium" would be removed by the influence of sun, rain, frosts, or snows. This haphazard quarantine was extremely expensive, proceeding at times even to burning the entire ship and cargo.

Modern methods of quarantine both on land and sea are based, as stated above, upon known modes of transmission and periods of incubation of certain diseases which are classed as quarantinable. The studies of the last 30 years have established that many diseases, including all of those known as quarantinable, are due to certain microorganisms with definite habits of life and capable of growth and multiplication. These so-called pathogenic organisms may be carried from individual to individual by direct contact with a person sick of the disease or by a carrier, a "carrier" being a person who harbors a pathogenic organism without showing evidence of the disease; they also may exist a relatively short time in or on other than living material as in water, milk, or other food, or they may be transmitted from one human being to another by an intermediary living agent or "vector," as the body louse in typhus, the mosquito in yellow fever, and the flea in transmitting plague to the human being from an infected rat.

After the germs have invaded or attacked a healthy individual they either die or survive. If the latter, a certain number of days must elapse before they have multiplied to sufficient numbers to produce symptoms of disease. This interval of time is known as the period of incubation. This period of incubation varies in length for the different diseases, as well as for the same disease within certain well-defined limits. The period of detention or observation in quarantine is based upon the maximum number of days within which experience has shown the suspected disease will manifest itself if present.

The absence of sickness in the personnel of a vessel does not necessarily mean an absence of infection aboard the vessel. This can be readily understood when it is remembered that a healthy person may carry or harbor the germs of a disease in his body, as, for instance, a cholera carrier, or that the intermediary host may be present without actually coming in contact with the crew, as, for instance, plague-infected rats in cargo under battened hatches. In either event possible contact with an individual on ship or ashore might mean the beginning of an epidemic. It is therefore clear why a vessel may be detained in quarantine, even though there be no sickness among crew or passengers.

The United States Government has declared the following diseases to be quarantinable and subject to quarantine under the provisions of the United States quarantine laws and regulations of the Treasury Department, enforced by the United States Public Health Service: Asiatic cholera, yellow fever, plague, anthrax, smallpox, typhus fever, leprosy.

**Inspection is required of—**

(a) All vessels from ports at which cholera, yellow fever, or plague in men or rodents prevail, or at which smallpox or typhus fever prevails in epidemic form, and at which a medical officer is detailed.

(b) All vessels carrying steerage passengers; but need only include the inspection of such passengers and their living apartments if sailing from a healthful port.

Inspection of the vessel is such an examination of the vessel, cargo, passengers, crew, personal effects of same, including examination of manifests and other papers, food and water supply, the ascertainment of its relations with the shore, the manner of loading, and possibilities of invasion by rats and insects as will enable the inspecting officer to determine if these regulations have been complied with.

When an inspection is required, it should be made by daylight, as late as practicable before sailing. The vessel should be inspected before the passengers go aboard, the passengers just before embarkation, and the crew on deck, and no communication should be had with the vessel after such inspection except by permission of the officer issuing the bill of health.

Vessels, prior to stowing cargo or receiving passengers, should be mechanically clean in all parts, especially in the hold, forecastle, and steerage, and loose dunnage in unladen compartment shall be so arranged as to prevent harborage of rodents.

Any portions of the vessel liable to have been infected by any communicable disease should be disinfected before the issuance of the bill of health.

The air space, ventilation, food and water supply, hospital accommodations, and all other matters mentioned therein promotive of the health and comfort of the passengers must be in accordance with the provisions of the act of Congress approved August 2, 1882, entitled "An act to regulate the carriage of passengers by sea."

Bedding, upholstered furniture, soiled wearing apparel, personal effects, and secondhand articles of a similar nature coming from a district known to be infected with smallpox or as to the origin of which no positive evidence can be obtained, and which the consular or medical officer has reason to believe is infected, should be disinfected prior to shipment. Articles similar to the above mentioned, if from a district infected by plague or typhus, should be inspected, and, if necessary, treated to destroy vermin.

Articles from an uninfected district shipped through an infected port may be accepted without restriction if not exposed to infection in transit.

Nothing in these regulations shall be construed to modify or nullify in any way existing restrictions promulgated by the Secretary

of the Treasury at the instance of the Secretary of Agriculture for the prevention of the introduction of diseases of animals.

Any article shipped from or through an infected port or place which the consul or medical officer has reason to believe infected, should be disinfected.

Any article presumably infected which can not be disinfected should not be shipped.

Passengers, for the purpose of these regulations, are divided into two classes, cabin and steerage.

So far as possible passengers should avoid embarking at a port where quarantinable disease prevails, and communication between the vessel and the shore should be reduced to a minimum. In such a port the personnel of the vessel should remain on board during their stay.

No person suffering from a quarantinable disease, or scarlet fever, measles, diphtheria, poliomyelitis (infantile paralysis), influenza, chicken pox, or cerebrospinal meningitis should be allowed to ship.

Passengers and crews, merchandise, and baggage, prior to shipment at a noninfected port but coming from an infected locality should be subject to the same restrictions as are imposed at an infected port.

#### GENERAL REQUIREMENTS AT SEA.

The master of a vessel should observe the following measures on board his vessel:

(a) The water-closets, forecastle, bilges, and similar portions of the vessel liable to harbor infection should be frequently cleansed and disinfected.

(b) Free ventilation and rigorous cleanliness should be maintained in all portions of the ship during the voyage and measures taken to destroy rats, mice, fleas, flies, mosquitoes, and all vermin.

(c) A patient sick of a communicable disease should be isolated and one member of the crew detailed for his care and comfort, who, if practicable, should be immune to the disease.

(d) Communication between the patient or his nurse and other persons on board should be reduced to a minimum.

(e) Used clothing, body linen, and bedding of the patient and nurse should be immersed at once in boiling water or in a disinfecting solution.

(f) The compartment from which the patient was removed should be disinfected and thoroughly cleansed. Articles liable to convey infection should remain in the compartments during the disinfection when gaseous disinfection is used.

(g) Any person suffering from malaria or yellow fever should be kept under mosquito bars and the apartment in which he is confined closely screened with mosquito netting. All mosquitoes on board should be destroyed by fumigation. Mosquito larvæ (wigglers or wiggle tails) should be destroyed in water barrels, casks, and other collections of water about the vessel by the use of petroleum (kerosene); where this is not practicable, the receptacle should be covered by mosquito netting to prevent the exit of mosquitoes from such breeding places.

(h) In the case of bubonic plague, special measures must be taken to destroy rats, mice, fleas, and other vermin on board, and in case of pneumonic plague, the patient should be isolated, the body discharges disinfected, especially sputum, and the attendant should wear a mask.

(i) In the case of typhus, special measures should be taken to destroy vermin.

(j) In the case of cholera, typhoid fever, or dysentery, the drinking water should be boiled and the food thoroughly cooked. The discharges from the patient should be immediately disinfected and thrown overboard.

An inspection of the vessel, including the steerage, should be made by the ship's physician once each day.

Should cholera, yellow fever, smallpox, typhus fever, plague, or any other communicable disease appear on board a ship while at sea, those who show symptoms of these diseases should be immediately isolated in a proper place; the ship's physician should then immediately notify the captain, who should note same in his log, and all of the effects liable to convey infection which have been exposed to infection should be destroyed or disinfected. In the case of smallpox, the entire personnel should be vaccinated.

The hospital should be cleansed as soon as it becomes vacant.

The dead, except those dead of yellow fever, should be enveloped in a sheet saturated with one of the strong disinfecting solutions, without previous washing of the body, and at once buried at sea or placed in a coffin hermetically sealed.

A complete clinical record shall be kept by the ship's surgeon of all cases of sickness on board and the record delivered to the quarantine officer at the port of arrival.

The following disinfecting solutions are recommended for use at sea:

#### FORMULÆ FOR STRONG DISINFECTING SOLUTIONS.

##### Bichloride of Mercury (1:500).

	Parts.
Bichloride of mercury-----	1
Sea water-----	500
Mix.	

Carbolic Acid (5 Per Cent).		Parts.
Alcohol	-----	50
Carbolic acid, pure	-----	50
Mix.		
Then add fresh water	-----	900

## FORMULÆ FOR WEAK SOLUTIONS.

## Bichloride of Mercury (1:1,000.)

Bichloride of mercury	-----	1
Sea water	-----	1,000

## Carbolic Acid (2½ Per Cent).

Carbolic acid, pure	-----	25
Fresh water	-----	1,000

## Formalin (5 Per Cent).

Formalin (or formal)	-----	50
Water	-----	950

It is suggested that a vessel should carry for every 100 passengers: Bichloride of mercury, 5 pounds; carbolic acid, 10 pounds; alcohol, 10 pounds; formalin, 10 pounds; 100 pounds of sulphur and 12 Dutch ovens, about 12 inches diameter, and an adequate supply of fresh vaccine virus.

## INSPECTION.

Every vessel subject to quarantine inspection, entering a port of the United States, its possessions or dependencies, shall be considered in quarantine until given free pratique. Such vessel shall fly a yellow flag at the foremast head and shall observe all the other requirements of vessels actually quarantined.

Vessels arriving at ports of the United States under the following conditions shall be inspected by a quarantine officer prior to entry:

(a) Vessels from a foreign port shall be inspected only at first port of call in the United States, except vessels from ports suspected of yellow fever arriving during the active quarantine season at southern, via northern, ports.

(b) Any vessel with sickness on board.

(c) Vessels from domestic ports where cholera, plague, or yellow fever prevails, or where smallpox or typhus fever prevails in epidemic form.

The inspection of vessels required by these regulations shall be made between sunrise and sunset, except in case of vessels in distress. Exception may also be made in the case of vessels carrying perishable cargoes, and regular line vessels under regulations approved by the Secretary of the Treasury.

In making the inspection of a vessel the bill of health and clinical record of all cases treated during the voyage, crew and passengers'

lists and manifests, and, when necessary, the ship's log shall be examined. The crew and passengers shall be mustered and examined and compared with the lists and manifests and any discrepancies investigated. The clinical thermometer should be used in the examination of the personnel of vessels under suspicion. When a freight manifest shows that articles requiring disinfection under these regulations are carried by the vessel, a certificate of disinfection, signed by a United States consul or a medical officer of the United States, shall be exhibited and compared with same. If no certificate of disinfection is produced the collector of customs at the port of entry shall be notified of same by the quarantine officer. The collector of customs shall then hold such consignment in a designated place, separate from other freight, pending the arrival of the certificate of disinfection; and in the event of its nonarrival the articles shall be disinfected as hereinbefore prescribed, or shall be returned by the common carrier conveying same.

Medical officers of the United States duly clothed with authority to act as quarantine officers at any port or place within the United States, when performing the said duties, are hereby authorized to take declarations and administer oaths in matters pertaining to the administration of the quarantine laws and regulations of the United States. (Act of Mar. 2, 1901, sec. 12.)

No person, except the quarantine officer, his employees, or pilots, shall be permitted to board any vessel subject to quarantine inspection until after the vessel has been inspected by the quarantine officer and granted pratique, and all such persons so boarding such vessel shall, in the discretion of the quarantine officer, be subject to the same restrictions as the personnel of the vessel, or otherwise action may be taken as provided for in section 10, act of March 2, 1901, provided, however, that the United States customs officials may be permitted to board a vessel that has been inspected and held in quarantine for detention or treatment, they being subject to the same restrictions as the personnel of the vessel.

When a vessel arriving at quarantine has on board any of the communicable but nonquarantinable diseases the quarantine officer shall promptly inform the local health authorities of the existence of such disease aboard and shall make every effort to furnish such notification in ample time, if possible, to permit of the case being seen by the local authorities before discharged from the vessel.

#### QUARANTINE DETENTION.

Vessels arriving under the following conditions shall be placed in detention:

(a) With quarantinable disease on board or having had such disease on board during the voyage.

(b) Any vessel which the quarantine officer considers infected with quarantinable disease.

(c) A vessel arriving at a port south of the southern boundary of Virginia in the season of active quarantine, April 1 to November 1, from a port infected or suspected of infection with yellow fever.

(d) Vessels arriving at ports north of this line and south of the southern boundary of Maryland between May 15 and October 1, if from a port infected or suspected of infection with yellow fever.

(e) In the case of vessels arriving at a northern port without sickness on board from ports where yellow fever prevails the personnel shall be detailed under observation at quarantine to complete six days from the port of departure.

(f) Towboats and other vessels having had communication with vessels subjected to quarantine shall themselves be quarantined if they have been exposed to infection.

The duration of detention of vessels or personnel herein contemplated will depend upon the quarantinable disease involved and will hereinafter be specifically provided for.

#### SPECIAL REGULATIONS RELATING TO NAVAL VESSELS.

Vessels of the United States Navy entering ports of the United States, its possessions or dependencies, are exempt from inspection if there be a medical officer aboard, provided such vessel has not sailed from a foreign port known to be or suspected of being infected with typhus, cholera, yellow fever, plague, or smallpox.

Vessels of the United States Navy are subject to quarantine inspection upon arrival at ports of the United States, its possessions or dependencies, when from a foreign port known or suspected to be infected with yellow fever, bubonic plague, typhus, cholera, and such subsequent detention for disinfection as may be required by reason of disease aboard or exposure to such disease in foreign ports.

The certificate of the medical officer of the United States Navy as to the sanitary history of the vessel and its personnel may be accepted for naval vessels by the quarantine officer boarding the vessel in lieu of actual inspection.

Vessels of the United States Navy having entered the harbors of infected ports but having held no communication which is liable to convey infection may be exempted from the disinfection and detention imposed on merchant vessels from such ports.

Vessels of the United States Navy not carrying a medical officer shall, upon arrival at ports of the United States from foreign ports, be subject to the same provisions of these regulations as apply to merchant vessels.

No vessel from a foreign port is permitted to enter any port of the United States until pratique has been granted by a United States

quarantine official. Until pratique has been granted the vessel is in quarantine and can hold no unauthorized communication with the shore. A merchant vessel can not enter at the customhouse without presenting the certificate of pratique which shows that the vessel has been released from quarantine.

#### BILLS OF HEALTH.

Masters of vessels clearing from or leaving any foreign port or any port in the possessions or other dependencies of the United States for a port in the United States or its possessions or other dependencies must obtain a bill of health, in duplicate, signed by the proper officer or officers of the United States as provided for by law.

By act of Congress certain vessels are exempt from this requirement. Vessels so exempt are those plying between Canadian ports on the St. Croix River, the St. Lawrence River, the Niagara River, the Detroit River, the St. Clair River, and the St. Marys River, and adjacent ports of the United States on the same waters; also vessels plying between Canadian ports on the following-named lakes, viz, Ontario, Erie, St. Clair, Huron, Superior, Rainy Lake, Lake of the Woods, Lake Champlain, and ports of the United States; also vessels plying between ports in British Columbia and ports on the Pacific coast of the United States as far south as (inclusive) San Francisco; also vessels plying between Canadian ports on the Atlantic coast and ports of the United States on the Atlantic coast as far south (inclusive) as Boston; also vessels plying between Mexican ports on the Rio Grande River and ports of the United States on the same river. Vessels sailing originally from other foreign ports and merely calling at Canadian ports en route to the United States are not exempt from the provisions of section 2 of the act approved February 15, 1893. During the prevalence of any of the quarantinable diseases at the foreign port of departure, vessels above referred to are required to obtain from the consular officer of the United States, or from the medical officer of the United States, when such officer has been detailed by the President, a bill of health, in duplicate, in the form prescribed by the Secretary of the Treasury.

Naval vessels clearing from one United States port for another United States port do not ordinarily procure a bill of health for presentation at the port of arrival. Local or State authority at the port of arrival may, however, require the exhibition of a bill of health under special circumstances, such as when some epidemic disease exists at the port of departure, and under such circumstances it is advisable to procure a bill of health.

A naval vessel from a United States port to a port in the Canal Zone or the possessions or other dependencies of the United States

should secure a bill of health from the customhouse or the port authorities.

Jurisdiction in matters of sanitation and quarantine in the waters of Colon and Panama is exercised by the United States authorities of the Canal Zone. In all ports in the Canal Zone original bills of health in duplicate are required to be obtained by masters of vessels clearing from any foreign port or any port in the possessions or other dependencies of the United States. (Executive Order No. 1761 of April 15, 1913.)

Naval vessels entering ports of the Dominican Republic will be required to have bills of health in order to pass quarantine examination at their original ports of entry in that country and otherwise comply with the existing quarantine laws and regulations.

Naval vessels sailing from a United States port to a foreign port should always procure a bill of health from the proper authorities and have it viséed by the consular or other representative of the country or countries of ports of call, if such ports can be determined upon prior to sailing. It is sometimes advisable to secure bills of health for several ports to which the vessel might go, when definite information of the exact destination is not procurable. A naval vessel sailing from a foreign port to another foreign port should likewise procure and have viséed a bill of health.

When preparing to leave a port in the United States the necessary bill of health may be obtained at the customhouse. In case the office of the United States Public Health Service is not in the same building the necessary directions can be obtained at the customhouse.

The person applying for the bill of health should take with him bills of health from the last port of departure and be prepared to furnish all data required for filling in the form indicated below.

If epidemic or communicable diseases are present in the port at the time of making the request, the consul of the nationality of the next port of call should be visited for his visé.

In foreign ports request for a bill of health should be made at the office of the captain of the port (*Bureau de Capitaine de Port, Ufficio dell Capitano dell Porto, Capitanía del Puerto*).

A United States consular bill of health should also be obtained at a port where the issue of such is customary, or a bill of health issued by the United States public health officer, if one is stationed there.

Vessels clearing from a foreign port or from any port in the possessions or other dependencies of the United States for any port in the United States, its possessions, or other dependencies, and entering or calling at intermediate ports, must procure at all such ports a bill of health in duplicate signed by the proper officer or officers of the United States.

Bills of health for naval vessels or indorsements by consular officers are usually extended gratis. Any expense involved in procuring bills of health or in quarantine is a charge against appropriations *not* under the Bureau of Medicine and Surgery. Quarantine expenses (bills of health and pratique) are a charge against "Pay, miscellaneous."

Bills of health for naval vessels in the fleet may be procured for the fleet as a whole by the fleet surgeon, if no diversion of individual ships is contemplated. Bills of health for individual ships should always be procured, however, in the absence of orders to the contrary, in view of the fact that a ship may at any time be detached from the fleet and ordered to operate singly.

On entering port, in addition to the bill of health, the medical officer of the ship shall be prepared to furnish the quarantine officer, if required, with a statement relative to health conditions prevailing on board ship. Certain diseases of a communicable or infectious character, not included among quarantinable diseases under the quarantine laws and regulations of the Treasury Department, such as the exanthemata, diphtheria, cerebrospinal meningitis, etc., will ordinarily be viewed by local or State authorities as constituting quarantinable diseases and their presence on board should be considered as rendering the vessel subject to local quarantine restrictions. All such diseases should be fully reported to the inspecting health officer.

The following form is prescribed for the United States bill of health:

Form 1937.

UNITED STATES OF AMERICA.

### BILL OF HEALTH.

I \_\_\_\_\_ (the person authorized to issue the bill at the port of \_\_\_\_\_), do hereby state that the vessel hereinafter named clears (or leaves) from the port of \_\_\_\_\_ under the following circumstances:

Name of vessel \_\_\_\_\_

Nationality \_\_\_\_\_

Master \_\_\_\_\_

Tonnage, gross \_\_\_\_\_ net \_\_\_\_\_

Name of medical officer \_\_\_\_\_

Number of officers \_\_\_\_\_

Of crew, including petty officers \_\_\_\_\_

Officers' families \_\_\_\_\_

Passengers destined for the United States \_\_\_\_\_

First cabin \_\_\_\_\_

Second cabin \_\_\_\_\_

Steerage \_\_\_\_\_

Ports visited within preceding four months \_\_\_\_\_

Location of vessel while in port:

Wharf-----

Open bay-----

Distance from shore-----

If any passenger or member of crew disembarked on account of sickness, state disease -----

Time vessel was in port -----

Character of communication with shore -----

Sanitary condition of vessel -----

Sanitary measures, if any, adopted while in port -----

Sanitary condition of port and vicinity -----

Prevailing diseases at port and vicinity -----

Number of cases and deaths from the following-named diseases during the past two weeks ending -----

Diseases.	Number of cases.	Number of deaths. <sup>1</sup>	Remarks. (Any condition affecting the public health existing in the port of departure or vicinity to be here stated.)
Yellow fever.....	.....	.....	
Asiatic cholera.....	.....	.....	
Cholera nostras or cholérine.....	.....	.....	
Smallpox.....	.....	.....	
Typhus fever.....	.....	.....	
Plague.....	.....	.....	
Leprosy.....	.....	.....	

<sup>1</sup> When there are no cases or deaths, entry to that effect must be made.

Date of last case (within preceding year):

Cholera-----

Yellow fever-----

Human plague-----

Typhus-----

Rodent plague-----

I certify that the vessel has complied with the Quarantine Rules and Regulations made under the act of February 15, 1893, and that the vessel leaves this port bound for -----, United States of America, via -----

Given under my hand and seal this ----- day of -----, 19--.

(Signature of consular officer.) -----

[SEAL]

Countersigned by—

-----  
*Medical Officer, United States Public Health Service.*

# GENERAL REQUIREMENTS OF THE UNITED STATES PUBLIC HEALTH SERVICE AT FOREIGN AND INSULAR PORTS.

The officer issuing the bill of health to vessels leaving foreign ports and ports in the possessions or other dependencies of the United States for ports in the United States or its possessions or other

dependencies shall satisfy himself, by inspection if necessary, that the conditions certified to therein are true. He is authorized, in accordance with law, to withhold the bill of health until he is satisfied that the vessel, the passengers, the crew, and the cargo have complied with all the quarantine laws and regulations of the United States.

#### SPECIAL QUARANTINE MEASURES.

##### CHOLERA.

This disease is caused by the cholera vibrio when introduced into the gastrointestinal tract. Food or water indirectly contaminated is the chief means by which the disease is conveyed, but on board ship direct contact or the immediate pollution of alimentary substances by "carriers" or acute cases are to be considered the more common means by which the cholera infection is transmitted. The possibility of water ballast being infected or constituting a probable source of spreading the disease is so remote as to be negligible, and the same applies in a general way to cargo and ship supplies. Accurate knowledge that none of the personnel is harboring cholera organisms in his gastrointestinal tract is the most important feature in the treatment of cholera-infected vessels.

In cholera the control of the human host and the safe disposal of the excreta therefrom, the destruction of contaminated food or water, or their sterilization—cooking, boiling, etc.—are the essential features in preventive measures. Fumigation or place disinfection is not called for in cholera preventive measures. Where a case of cholera has resulted in soiling the bedding, as an added precaution such effects should be sterilized and the floors and walls of the compartment washed down with bichloride solution. The cholera vibrio has practically no resistance to drying, however, and under natural conditions it is improbable that soiled linen or an infected place will result in the spread of the disease. While bathing and personal cleanliness is to be encouraged at the quarantine station, it is not to be assumed that disinfection of wearing apparel and personal effects of the contacts or the disinfection of the body has any material effect in preventing the spread of the infection. The control of the personnel and the assured safe disposal of body discharges and protection of food and water supply are the important features to be observed in the prevention of cholera.

#### SPECIAL MEASURES AGAINST CHOLERA AT FOREIGN AND INSULAR PORTS.

At ports where cholera prevails special care should be taken to prevent the water and the food supply from being infected. The drinking water, unless of known purity, should be boiled and the

food thoroughly cooked and protected against contamination by flies, etc.

The latrines of vessels must be so arranged that they, including their discharge pipes, can be made and kept mechanically clean.

Certain food products that are ordinarily consumed in an uncooked state coming from cholera-infected localities or through such localities, if exposed to infection therein, should not be shipped. Vegetables ordinarily eaten in an uncooked state when grown in districts where cholera prevails shall not be shipped. Fruits grown on trees or on shrubs may be shipped.

The baggage of steerage passengers shall be inspected, and no food shall be taken aboard in such baggage.

Steerage passengers and crew coming from cholera-infected districts should be subjected to bacteriological examination or otherwise detained five days in an environment known to be free from any source of infection.

Steerage passengers and crew from districts not infected with cholera, shipping at a port infected with cholera, unless passed through without danger of infection, should be treated as those in the last paragraph.

Cabin passengers coming from cholera-infected districts should produce satisfactory evidence as to their exact place of abode during the five days immediately preceding embarkation. If it appears that they have been exposed to infection, they shall be detained under medical supervision a sufficient time to cover the period of incubation since last exposure, or otherwise be subjected to bacteriological examination.

Should cholera appear in the barracks or houses in which passengers are undergoing detention, no passengers from said houses or barracks who have been previously exposed to this new infection should embark until they have been determined free of the infection by bacteriological examination or otherwise isolated for a period of five days.

#### SPECIAL MEASURES AGAINST CHOLERA AT DOMESTIC PORTS.

Special measures shall be employed against vessels and persons from a cholera-infected place, as likewise when cholera has appeared on board during the voyage.

All steerage passengers arriving at ports in the United States, its possessions or dependencies, from ports or places where cholera prevails, shall be subjected to bacteriological examination and shall not be admitted to entry until it has been determined by said examination that they are free from cholera vibrios.

All persons on vessels upon which cholera has appeared during the voyage shall upon arrival at quarantine be detained until it has

been determined by bacteriological examination that they are free from cholera vibrios.

Persons in detention who are proven by bacteriological examination (performed not less than 24 hours after removal from exposure to infection in cholera case or carrier) to be free from cholera organisms may be discharged from quarantine without further detention.

In lieu of bacteriological examination (and then only when it is impracticable) persons exposed to infection in cholera case or carrier shall be detained in quarantine five days after being isolated from such case or carrier.

If a case clinically diagnosed as cholera has occurred on voyage, or if bacteriological examination should reveal the presence of infection in any person on board, such infected person or persons should be removed and isolated. All contacts should be segregated in small groups, and no material capable of conveying infection shall be removed from the ship.

Fruits and vegetables from an infected ship, that are ordinarily consumed in an uncooked state, shall be destroyed or rendered harmless by cooking.

The food served to persons in quarantine, unless from a source known to be free from cholera infection, shall be cooked.

The water supply of a vessel detained in quarantine on account of cholera infection, unless determined by bacteriological examination to be free from cholera organisms or *B. coli*, shall be sterilized. Otherwise it shall be discharged after disinfection.

The dejecta of all persons in quarantine on account of cholera shall be disinfected before final disposition, and special precautions shall be exercised in order to prevent the contamination of food or water supply or the spread of the infection through the agency of flies or other insects.

Personal effects contaminated by dejecta from a cholera case or carrier shall be disinfected.

Any part of the ship that has been contaminated by dejecta from a cholera case or carrier shall be washed down with a solution of bichloride or carbolic acid.

Carriers or recovered cases shall not be released from quarantine detention until three bacteriological tests performed on consecutive days shall have been proven to be negative.

#### YELLOW FEVER.

The organism causing this disease is the *Leptospira icteroides*, transmitted to man only by a species of mosquito, i. e., *Aedes calopus* (Stegomyia), and this only after an intrinsic cycle of development

in the body of such mosquito, which requires about 12 days. The mosquito can acquire the organism by sucking blood from a patient ill with yellow fever only during the first three days of the disease.

The only procedure that is called for in preventing the spread of yellow fever (aside from the control of the human host) is that for the destruction of mosquitoes, and this is best accomplished by fumigation with sulphur dioxide or hydrocyanic acid gas. Bactericidal measures have no place in the prevention or destruction of yellow-fever infection.

#### SPECIAL MEASURES AGAINST YELLOW FEVER AT FOREIGN AND INSULAR PORTS.

For the purpose of these regulations six days shall be considered as the period of incubation of yellow fever.

It is advisable that at ports where yellow fever prevails precautions should be taken to prevent the introduction of mosquitoes, *Aedes calopus* (Stegomyia), on board the vessel. Water tanks, water buckets, and other collections of water about the vessel should be guarded in such a manner that they shall not become breeding places for mosquitoes. Where the vessel has lain in such proximity to the shore at such places as to render it liable, in the opinion of the inspecting officer, to the access of *Aedes calopus* (Stegomyia) measures should be taken to destroy mosquitoes that may have come on board.

Passengers and crew who, in the opinion of the inspecting officer, have been definitely exposed to the infection of yellow fever (i. e., as from a house or locality known to be infected) should not be allowed to embark for six days after said exposure. Those immune to yellow fever are exempt from this provision.

#### SPECIAL MEASURES AGAINST YELLOW FEVER AT DOMESTIC AND INSULAR PORTS OF ARRIVAL.

A vessel aboard which a case of yellow fever has occurred at any time during the voyage shall be treated as follows:

- (a) Careful visual and thermometric inspection of all persons.
- (b) The sick are to be immediately disembarked, protected by netting against the access of *Stegomyia* mosquitoes, and transferred to a place of isolation.
- (c) Other persons should be disembarked, if possible, and detained under observation for six days, dating from the day of last possible exposure.
- (d) Persons under observation presenting an elevation of temperature above  $37.6^{\circ}$  C. shall be isolated in a screened apartment.
- (e) The ship shall be moored, if possible, at least 200 meters from the inhabited shore.

(f) The ship shall be fumigated for the destruction of mosquitoes before the discharge of cargo, if possible. If a fumigation be not possible before the discharge of the cargo, the discharge of cargo shall be under the supervision of the quarantine officer and may be permitted as follows: By (1) the employment of immune persons for discharging the cargo; or (2) if nonimmunes be employed, they shall be kept under observation during the discharging of cargo and for six days, to date from the last day of exposure on board.

A vessel which has lain in such proximity to the shore of a port known to be infected as to render it liable to the access of *Stegomyia* mosquitoes shall be fumigated and the personnel held in detention under observation for six days.

A vessel arriving at a southern port (either direct or by way of a northern port of the United States) which, although coming from an infected port or suspected port, has had neither death nor case of yellow fever on board, either before departure, during the voyage, or at the time of arrival, and which the quarantine officer is satisfied has not lain in such proximity to the shore as to render it liable to the access of *Stegomyia* mosquitoes, or which has been fumigated under the supervision of an accredited medical officer of the United States immediately before sailing, may, upon arrival at a port of destination in the United States with good sanitary history and in good condition (including the absence of any exposed collection of water in which *A. calopus* might breed) be subjected to the following treatment:

(a) If arriving in six days or less, she may be admitted to pratique with or without fumigation, in the discretion of the quarantine officer, and without further detention than is necessary to complete the six days.

(b) If arriving after six days, she shall be immediately fumigated (unless previously fumigated at a northern port) and may be admitted without detention.

Vessels from ports infected or suspected of infection with yellow fever, calling at southern ports for bunker coal or supplies during the active quarantine season, may be allowed to take on such cargo after fumigation, provided the vessel be anchored in a place inaccessible to *Stegomyia* and the crew or passengers be detained on board.

Traffic without detention may be allowed during the active quarantine season from ports infected or suspected of infection with yellow fever to ports in the United States south of the southern boundary of Maryland under the following conditions:

(a) The vessel must lie at approved moorings in the open harbor: the crew must not be allowed ashore at the port of departure.

Every possible precaution must be taken to prevent the ingress of *Stegomyia* mosquitoes and their access to the crew.

(b) The officer who must go ashore to enter his vessel must be immune to yellow fever. Passengers unless immune to yellow fever must have been free from possible exposure to yellow fever for six days immediately prior to embarking.

(c) All the above conditions to be certified to specifically by an accredited medical officer of the United States.

All persons who can prove their immunity to yellow fever or who have not been exposed to possible infection of yellow fever may be permitted to land at once.

For the destruction of mosquitoes there shall be a complete and simultaneous fumigation of all parts of the vessel by sulphur dioxide gas, 2 per cent volume gas, two hours' exposure, or by cyanide gas in strength of one-half ounce of cyanide per 1,000 cubic feet of space, one-half hour exposure.

#### PLAGUE.

This disease is caused by the *Bacillus pestis*.

*Bubonic plague*.—This is the most common form of the disease and is transmitted to man through the agency of rats and mice and their ectoparasites, i. e., fleas. It is primarily and essentially a disease of rodents. It is only accidentally transmitted to the human by means of the fleas which have fed on an infected rodent host and which, having become dislodged and finding no other preferred host available, perforce turn to the human as the only source of blood supply. It is alleged that the bedbug may transmit the disease. As it is not a parasite of the rat, it probably would never attack the rat under natural conditions. The only means of its transmitting the disease would be through the ingestion of blood from the human host during the infectious stage. This would be possible only in cases of septicemic plague. Under such conditions it is not improbable that the bedbug may be infectious for any subsequent human host which it might attack. Such a combination of circumstances is a rare occurrence. In any event, the bedbug would cause only individual cases of the disease and would not be productive of an epidemic or operate to the widespread dissemination of the disease.

From the foregoing, therefore, it is evident that the treatment of plague-infected vessels calls for the definite destruction of all rodents and their parasites and bedbugs where there have been septicemic types of the disease. While fleas normally have their habitat on their preferred host, it must be borne in mind that these parasites may occasionally be dislodged and temporarily be found in the en-

vironment. When rodent infection has actually been demonstrated on board a vessel, consideration should be given to the destruction of rats, mice, and fleas in all parts of the vessel by some disinfecting agent which will penetrate to all parts of the vessel and will be toxic both to animal and insect life. Sulphur dioxide and hydrocyanic acid gas are best adapted for this purpose. When human cases are found on vessels that have acquired their infection en route, indicating the dispersal of infected fleas, it may be advisable that the clothing and personal effects of the passengers and crew be treated for the destruction of any fleas that may have become lodged thereon.

Disinfection for the purpose of destroying bacteria for the prevention of bubonic plague is irrational and unnecessary.

*Pneumonic form of plague.*—From an epidemiological standpoint and as to the application of preventive measures, pneumonic plague and bubonic plague are to be considered as wholly separate diseases. Pneumonic plague is transmitted solely through personal contact in the same fashion as pneumonia or other respiratory diseases. Neither the flea nor other insects are concerned in the direct transmission of pneumonic plague.

#### SPECIAL MEASURES AGAINST PLAGUE AT FOREIGN AND INSULAR PORTS.

At ports or places suspected of plague infection in rodents every precaution shall be taken to prevent rats (mice) and fleas from getting aboard.

Vessels sailing from such ports shall be simultaneously fumigated in all parts, preferably when empty, for the destruction of rats. Lighters should be free of rats, and this is best accomplished by periodic fumigation.

If the vessel lies at a dock all connecting lines should be guarded by inverted cones or disks not less than 3 feet in diameter and so fixed as to be always at a right angle to the line to which it is attached.

Articles which harbor or are liable to harbor rats or rat fleas should not be shipped until freed of such vermin, either by the use of chemicals, fumigation, or by preventing the access of rats. The nature of the merchandise and the place and method of stowing prior to shipment must be considered in determining its liability to be a rat or vermin carrier, thus: Crated cargo, bags of grain, etc., so stowed as to be used as nesting places for rats would be flea, and might be rat, carriers, and cargo should preferably have been previously stored in rat-proof warehouses. Articles of cargo in open crates should be carefully inspected to determine freedom from rats and, at the discretion of the inspector, may be rejected for shipment if considered as rodent infected. When the cargo of a vessel

consists of grain or other rat food, extra precautions should be taken to prevent rats from going aboard.

SPECIAL MEASURES AGAINST PLAGUE AT PORT OF ARRIVAL.

Ships on which plague has occurred in men or rodents shall be detained in quarantine, the sick, if any, shall be removed and isolated, and the destruction of rats shall be effected as soon as practicable.

A plague-infected ship shall be fumigated simultaneously in all parts for the destruction of rats, including those that may be within articles of cargo, and other precautions shall in the meantime be observed to prevent the escape of rats from the ship.

All rodents destroyed on vessels at quarantine shall, when practicable, be bacteriologically examined.

All persons sick of plague shall be detained in quarantine until well, but no detention of healthy contacts is contemplated (except in the pneumonic type of the disease), other than is incidental to the treatment of vessels or cargo.

If pneumonia plague has occurred on board ship during the voyage, the sick shall be removed and isolated and all crew and passengers that have been exposed to the infection shall be detained in quarantine for a period of seven days, or, at the discretion of the quarantine officer, until their secretions shall be proven to be free from *B. pestis*.

The quarantine officer, before granting pratique to a vessel that has been detained in quarantine on account of plague infection, shall assure himself that the vessel is free from rats and vermin.

The personal effects in use and the belongings of crew and passengers which in the opinion of the quarantine officer are considered as infected shall be disinfected and rendered free from vermin.

Vessels from foreign ports or ports in the possessions or dependencies of the United States or domestic ports that are known or suspected of being infected with plague may, when loaded with cargo the nature of which or manner of storage precludes effective fumigation, be permitted to enter subject to the terms of a provisional pratique. When lying alongside wharf or dock at United States ports such vessels shall take proper precautions to prevent the passage of rodents. The vessel shall be fended off from wharf or dock not less than 4 feet, and on all connecting lines shall be fixed rat guards of sheet metal of an approved design not less than 3 feet in diameter. All cargo nets and similar devices extending between the vessel and shore structures shall be removed at night unless in actual use, as likewise gangways and ladders, unless guarded. Any vessel so entering and neglecting to effectively apply such measures may, at the discretion of the Surgeon General, be remanded to the

quarantine station for discharge of cargo or required to discharge cargo at anchor well removed from the wharf.

Vessels from ports known to be infected with plague in man or rodents which have docked or which have not taken precautions necessary to prevent the ingress of rats and on which effective measures have not been taken to destroy the same under the supervision of an accredited medical officer of the United States Government shall, upon arrival at a port in the United States, be fumigated for the destruction of rats.

All vessels engaged in trade with foreign ports shall be fumigated not less than once every six months for the purpose of destroying rats. This is best done when the vessel is empty.

A fumigation certificate signed by an accredited medical officer of the United States Government will be the evidence accepted by the quarantine officer in considering the enforcement of paragraph 103.

In applying plague-preventive measures vessels without cargo shall be fumigated simultaneously in all parts with sulphur dioxide gas, not less than 3 pounds per 1,000 cubic feet, for six hours' exposure, or by hydrocyanic-acid gas in the proportion of 5 ounces of sodium cyanide per 1,000 cubic feet of space (or equivalent amount of potassium cyanide) for two hours. If the vessel be loaded, the time of exposure shall be doubled.

When necessary in the treatment of infected vessels, the quarantine officer may require the master to partially discharge cargo for the purpose of effective performance of fumigation.

#### SMALLPOX.

The causative agent of this disease has not been identified, but for all practical purposes it may be considered that more or less intimacy of contact is essential for the spread of the disease. It should also be borne in mind that immune contacts or convalescents may transmit the virus in either their clothing, their personal effects, or possibly in the body secretions.

#### SPECIAL MEASURES AGAINST SMALLPOX AT FOREIGN AND INSULAR PORTS.

For the purpose of these regulations 14 days shall be considered as the incubation period of smallpox.

Passengers and crew coming from districts where smallpox prevails in epidemic form, or who have been exposed to smallpox, should be vaccinated before embarkation, unless they show satisfactory evidence of having acquired immunity to smallpox by previous attack, or successful vaccination within one year, and their baggage inspected and, if necessary, disinfected.

## SPECIAL MEASURES AGAINST SMALLPOX AT PORT OF ARRIVAL.

Vessels arriving with smallpox on board, or having had smallpox on board during the voyage, shall be treated as follows:

(a) The sick shall be removed and detained until recovered.

(b) All persons who in the opinion of the quarantine officer have been exposed to the infection shall be vaccinated, unless protected by a previous attack of smallpox, and detained in quarantine until the vaccination is protective against said exposure or, if they refuse vaccination, detained in quarantine for 14 days after last exposure to the infection.

(c) Those persons that have not been exposed to the infection may be released.

(d) All personal effects of passengers and crew that have been exposed to infection shall be disinfected. All compartments that have been exposed to the liability of infection shall be disinfected.

## TYPHUS FEVER.

The causative organism of this disease has not as yet been definitely isolated and accepted as such. The transmitting agent of typhus, however, is the louse, both the body louse and the head louse, but chiefly the former. No natural means of transmission of typhus infection other than the louse has been accepted.

The important feature in typhus-preventive measures is the assured destruction of all vermin on the person, clothing, and personal effects of those actually sick with typhus and those who have been in contact with typhus-infected persons. In this latter group are to be included those persons from a known typhus-infected area. The destruction of lice on clothing is best effected by heat, steam under pressure by preference, but flowing steam without pressure will suffice, provided the articles to be disinfected are not closely packed. Dry heat is likewise effective. Body lice and head lice can very well be destroyed by mechanical cleaning—soap and hot water—but the application of a solution of equal parts of vinegar and kerosene to hairy parts will greatly assist in the removal of nits and lice. This solution should be allowed to remain 15 minutes or half an hour before bathing. The treatment of personal effects and baggage of verminous persons is necessary, but in the case of those individuals who are passed free of vermin and not requiring disinfection their baggage likewise should be passed without treatment. Bactericidal measures are not called for in typhus prevention. The question is solely that of the destruction of lice and the detention in quarantine for a period of 12 days of those persons who have been intimately exposed to typhus infection and who presumably may develop the disease, as well as those actually sick.

## SPECIAL MEASURES AGAINST TYPHUS FEVER AT FOREIGN AND INSULAR PORTS.

For the purpose of these regulations 12 days shall be considered as the period of incubation for typhus fever.

Passengers and crew from ports infected with typhus shall not be allowed to embark unless demonstrably free from vermin, or otherwise treated for the destruction of vermin. The personal effects, wearing apparel, and baggage of those infested with vermin shall be disinfected.

Passengers from localities where typhus prevails embarking at a port not infected with typhus shall be treated as in the preceding paragraph.

Passengers and crew who, in the opinion of the inspecting officer, have been definitely exposed to infection (from a house, barracks, or other building in which has occurred a case of typhus) shall not be allowed to embark until 12 days after removal from the infected environment.

## SPECIAL MEASURES AGAINST TYPHUS FEVER AT PORT OF ARRIVAL.

Vessels on which typhus infection has occurred shall be detained in quarantine and the sick, if any, removed and isolated. The clothing, personal effects, and baggage of those infected and of those not demonstrably vermin free shall be treated for the destruction of vermin.

All persons found to be vermin (louse) infested shall be treated for destruction of lice.

All passengers and crew that have been exposed to the infection shall be detained under observation for a period of 12 days from last exposure to infection.

Those of the personnel that are demonstrably free from vermin and have not been exposed to the infection may be released without detention or disinfection of baggage.

Vessels on which typhus has appeared shall be detained and fumigated for destruction of vermin.

Cargo compartments of typhus-infected vessels need not be fumigated unless there be exceptional conditions that may render them vermin infested.

Sulphur dioxide and hydrocyanic acid gas are effective agents for the destruction of lice when used in proper strength and exposure.

## LEPROSY.

The causative agent of this disease is believed to be *B. leprae*, which is an "acid-fast" bacillus found in the tissues of persons having the disease. Nothing definite has been worked out as to the

manner in which the infection is transmitted and preventive measures are practically confined solely to the isolation and segregation of the leprous persons.

For the prevention of the spread of leprosy, the chief and practically the only measure called for is the isolation of the patient, either in a national or State leprosarium. When in temporary confinement at the quarantine stations, when traveling, or under other conditions that would entail contact with the public, especial precautions would include the sterilization of eating utensils used by the leper and the disinfection of bedclothes. As a measure of added precaution, the compartment in which the leper has lived or been confined should, after his removal, be sterilized by mechanical cleaning and fumigation with formaldehyde gas.

Alien lepers should not be permitted to embark at a foreign port for a port of the United States, its possessions or dependencies, either as a passenger or as a member of the crew.

Vessels arriving in quarantine with leprosy on board shall not be granted pratique until the leper and his baggage have been removed from the vessel to the quarantine station.

No alien leper shall be permitted to land, and to this end the case shall be certified as a leper and reported to the nearest commissioner of immigration.

If the leper be a citizen of the United States, the case shall promptly be reported to the Surgeon General for further action.

#### ANTHRAX.

Shaving brushes or lather brushes destined for shipment into the United States shall be made only from hair or bristles known to be free from anthrax spores.

Unless known to be free from anthrax spores such hair or bristles, before being made into shaving or lather brushes, shall be disinfected by one of the following methods: (a) By boiling for not less than three hours; (b) by exposure to steam under not less than 15 pounds gauge for not less than 30 minutes with a preliminary vacuum of at least 10 inches; (c) by exposure to streaming steam for not less than six hours.

Consignments of shaving brushes of foreign manufacture shall be accompanied by a consular certificate containing a statement as to the prevalence or nonprevalence of anthrax in the territory from which the brushes emanate and also to the effect that the materials entering into the manufacture of the brushes have or have not complied with the requirements of these regulations.

## DISINFECTION.

## PHYSICAL DISINFECTANTS.

*Cleansing with soap and water.*—The liberal and energetic use of soap and hot water will mechanically remove a high percentage of bacteria from the hands as well as from contaminated articles such as furniture, door knobs, bed frames, and all washable materials. Consequently, this measure is always to be carried out thoroughly preliminary to or in connection with other methods of disinfection.

*Exposure to direct sunlight in fresh outdoor air.*—Such exposure for several hours is always desirable, particularly for clothing and bedding and other articles which may not, or in the particular instance need not, be treated more energetically. Bright sunlight which has not penetrated a glass window, and hence had the ultra violet rays filtered out, will kill the common disease producing bacterial organisms in a few hours. Also these organisms can not withstand the complete drying that takes place in the fresh air. The tubercle bacillus, the virus of chickenpox, the virus of smallpox, and, in general, all spore-bearing bacteria are more resistant to sunlight and drying. Thirty hours of sunning is usually required to kill an anthrax spore.

*Burning.*—Of unquestioned efficacy, but seldom required.

*Boiling.*—Very efficient and of wide range of applicability. The articles must be wholly immersed for not less than 10 minutes in water actually boiling ( $100^{\circ}$  C.). The addition of 1 per cent of carbonate of soda renders the process applicable to polished steel, cutting instruments, or tools.

*Steam.*—(a) Flowing steam (not under pressure): Flowing steam when applied under suitable conditions is an efficient disinfecting agent. The exposure must be continued 30 minutes after the temperature has reached  $100^{\circ}$  C.

(b) Steam under pressure without vacuum: Steam under pressure will sterilize, provided that the process is continued 20 minutes after the pressure reaches 15 pounds per square inch. The air must be expelled from the apparatus at the beginning of the process. If impracticable to obtain the designated pressure, a longer exposure will accomplish the same result.

(c) Steam under pressure with vacuum: Steam in a special apparatus with vacuum attachment is the best method of applying steam under pressure, the object of the vacuum apparatus being to expel the air and to promote the penetration of the steam. The process is to be continued for 20 minutes after the pressure reaches 10 pounds to the square inch.

## CHEMICAL DISINFECTANT SOLUTIONS.

*Bichloride of mercury.*—Bichloride of mercury is a disinfectant of undoubted potency and wide range of applicability. It can not be depended upon to penetrate substances in the presence of albuminous matter, such as foodstuffs, blood, thick pus, feces, etc. It should be used in solutions of 1 to 1,000. The solubility of bichloride of mercury may be increased by using sea water for the solution, or by adding 2 parts per 1,000 of sodium or ammonium chloride to the water employed.

*Carbolic acid.*—Carbolic acid in the strength of 5 per cent may be substituted for the bichloride of mercury, and should be employed in the disinfection of the cabins and living apartments of ships to obviate injurious action on polished metals, bright work, etc. Carbolic acid is not as efficient as one of the soluble preparations of cresol in the same strength.

*Formalin.*—Formalin containing 40 per cent of formaldehyde may be used in a 5 per cent solution as a substitute for bichloride of mercury or carbolic acid and is useful for the disinfection of surfaces, dejecta, fabrics, and a great variety of objects, owing to its noninjurious character. Formalin solutions act harshly upon the hands.

*Chlorinated lime.*—Chlorinated lime in a 5 or 6 per cent solution freshly made from the powder which has been kept free from deterioration in a small sealed can or tightly stopped colored bottle is efficient and useful in the disinfection of sewage, stools, glass and earthen ware, and materials or articles which will not be damaged by its bleaching and corrosive action. When the package containing the chlorinated lime is opened there should be a strong odor of chlorine. It can be used for washing painted surfaces and scrubbing floors, and in water-closet bowls or urinals. It serves as a deodorant as well as a disinfectant. It may be used by attendants upon the sick to disinfect their hands. In disinfecting dejecta, stools should be completely covered with the solution, thoroughly mixed and allowed to stand for at least 30 minutes. The powder may be sprinkled over the stool, taking care to add sufficient in excess so that a 5 per cent solution will result when thoroughly mixed.

In making a solution for use, one-half pound of commercial chlorinated lime or "bleach" is to be dissolved in a gallon of water. The insoluble residue sinks to the bottom; the solution above contains about 6 per cent of chlorinated lime which is equivalent to 2 per cent of chlorine, the active disinfecting agent. Chlorinated lime can not be depended upon to kill the tubercle bacillus.

*Disinfection of drinking water by chlorination.*—Dissolve the soluble portions of 1 gram of chlorinated lime of tested chlorine

strength in a small volume of water and add this to 40 gallons of the water to be disinfected; mix thoroughly and allow to stand for at least 1 hour before using for drinking purposes.

#### GASEOUS DISINFECTANT AGENTS.

Gaseous agents are of value chiefly to kill insects and vermin. If it is considered necessary to fumigate in the case of a disease in the spread of which insects, vermin, or other forms of animal life play no part, formaldehyde is the best agent to use. Sulphur dioxide is not an efficient germicide but it is effective when used in proper concentrations to kill insects, rats, and vermin.

*Formaldehyde gas.*—Formaldehyde in the form of a fumigant has no value except as a surface disinfectant, and it is not efficient then unless the temperature of the air is above 50° F. and unless the relative humidity is at least 60 per cent.

One of the best methods of producing formaldehyde gas, and the one for which the necessary materials are issued for use on board naval vessels, is by the action of formalin on potassium permanganate or on barium dioxide.

To prepare a room for disinfection, measure the gross cubic space and calculate the amounts of ingredients required. Allow 500 cubic centimeters of formalin (solution of formaldehyde), which has not lost its strength, and 250 grams of potassium permanganate or 250 grams of barium dioxide for each 1,000 cubic feet of space. Paste up all cracks and openings with strips of paper. Open up all drawers in furniture and hang up all articles to be disinfected with separation between them so that all surfaces possible will be exposed to the gas. Then place a large pan partly filled with water near the center of the room on the floor. In this place a second receptacle of glass or metal containing the permanganate or barium dioxide. This should be large enough to contain 10 times the volume of formaldehyde to be used, as there is a tendency of the mixture to foam over. Pour the formalin from a bucket or pitcher on the permanganate crystals or barium dioxide powder. The gas is generated in great amount in a few seconds. The room or compartment should be kept tightly closed for 6 to 12 hours and then flooded with fresh air and sunshine if possible.

Another practical method is that of spraying formalin on sheets suspended in the room in such manner that the solution remains on the sheets in small drops. A sheet will hold about 5 ounces without dripping. Not less than 10 ounces of formalin should be sprayed for each 1,000 cubic feet of space. The method is limited to rooms or compartments not exceeding 2,000 cubic feet of space. The room must be tightly sealed and kept closed for not less than 12 hours.

Formaldehyde does not injure fabrics or most colors. In fumigating with formaldehyde the danger of fire should be guarded against. In the rapid evolution which occurs when formalin is poured on potassium permanganate or barium dioxide the gas may be in a comparatively dry state and as such is inflammable in the presence of a light, such as lighted matches, oil lamps, etc.

GASEOUS AGENTS FOR THE DESTRUCTION OF INSECTS AND VERMIN.

*Sulphur dioxide.*—Sulphur dioxide is the safest and most generally applicable and useful fumigant for the destruction of rats, fleas, lice, bed bugs, mosquitoes, etc.

Sulphur dioxide is only efficient in the presence of moisture, and it is only a surface disinfectant, as it lacks penetrating properties. An atmosphere containing 4.5 per cent can be obtained by burning 5 pounds of sulphur per 1,000 cubic feet of space. This amount would require the evaporation or volatilization of about 1 pint of water.

The following standards for sulphur dioxide as to strength and exposure appear in the Quarantine Laws and Regulations of the United States, published by the Treasury Department, United States Public Health Service:

(a) For mosquito destruction: 2 pounds of sulphur per 1,000 cubic feet of space, exposure for one hour.

(b) For destruction of lice: 4 pounds of sulphur per 1,000 cubic feet of space, exposure for six hours.

(c) For destruction of rats and fleas: 3 pounds of sulphur per 1,000 cubic feet of space, exposure for six hours.

These standards are for superstructures, partially filled store-rooms, and empty holds. For cargo-laden holds and well-filled storerooms, or in compartments that are packed with materials, the time of exposure should be doubled.

The sulphur may be burned in shallow iron pots (Dutch ovens), and each pot should stand in a vessel of water as a protection against fire. Shallow receptacles which afford ample burning surface are desirable. Dutch ovens with iron legs are convenient, but any iron pot of the proper size or even an iron bucket resting on bricks in a tub will do. Not more than 30 pounds of sulphur should be burned in one pot, and it is preferable to use a sufficient number of pots so that not more than 10 pounds need be burned in each one. With too great a quantity the sulphur does not always burn out completely within the exposure period, and better diffusion is secured with a number of pots well distributed.

The sulphur pots should be elevated from the bottom of the compartment to be fumigated in order to secure the maximum possible percentage of combustion of sulphur. Sulphur dioxide gas is

heavy and if the container is too low the gas in settling may smother the flame.

The sulphur should always be ground or mashed into a state of fine division. The sulphur is most conveniently ignited by placing upon it a pledget of waste saturated with alcohol or by pouring a little alcohol on the surface of the sulphur, making a little crater on top. Kerosene may be used in the same way or a red-hot coal may be used. Care should always be used to prevent damage to the cargo or vessel by fire. The pot farthest away from the point where the fumigator is to make his exit should be ignited first, and the others in succession as promptly as possible, care being taken to see that each pot is well lighted.

Liquefied sulphur dioxide may be used for disinfection in place of sulphur dioxide generated as above, it being borne in mind that this process will require 2 pounds of the liquefied gas for each pound of sulphur, as indicated in the above paragraphs.

Sulphur dioxide is especially applicable to the holds of vessels or to freight cars and apartments that may be tightly closed and which do not contain objects which will be injured by the gas. Sulphur dioxide bleaches fabrics or materials dyed with vegetable or aniline dyes. It destroys linen or cotton goods by rotting the fiber through the agency of the acids formed. It injures most metals.

*Hydrocyanic acid gas.*—This is the most penetrating and the most deadly of all fumigants. It or the newer gas, cyanogen chloride, is to be used in preference to sulphur dioxide by quarantine officials, but hydrocyanic acid gas always involves such danger to human life that it is never to be used except under the careful direction of a medical officer specially trained in quarantine work.

#### GENERAL DETAILS IN THE FUMIGATION OF VESSELS.

All spaces to be fumigated must be made as nearly air-tight as possible. In fumigating the holds of vessels the hatches should be covered over with their regular waterproof tarpaulins and tightly battened down, leaving a corner that can be opened as a vent for the escape of the sulphur fumes. All air slits, scuttles, and chain ports should be closed. Doors should be sealed by means of strips of paper pasted over the cracks left between the frame and the door. All machinery and bright metal should be wiped over with vaseline in advance.

For computing the air space of a vessel a registered ton should be estimated as containing 100 cubic feet. A vessel of 1,000 net tonnage would, therefore, contain 100,000 cubic feet of air space in the holds alone, since net tonnage indicates the cargo-carrying capacity in con-

tradistinction to the gross tonnage which indicates the ship's total cubic capacity.

The cubic capacity of crews' quarters, cabins, engine room, poop deck, or other above-deck compartments have to be computed for each individual compartment.

The various details in connection with the fumigation of vessels are of almost equal importance as the nature of the fumigant used, and the observation of these details to a large extent determines the effectiveness or the inefficiency of the fumigation. All possible care should be observed by the quarantine officer to see that dead space in the vessel is opened up and all practical measures should be taken to aid in the diffusion of the fumigating gas, and this is especially important when sulphur dioxide is used. All dunnage and loose material from the holds of a vessel that is not cargo laden should be arranged in compact order and placed on elevated platforms to avoid rat harborage. If sulphur dioxide is generated in a furnace and lead into the vessel, it should be introduced at the lowest point and the hatches left open for a short while so as to permit of the escape of air and hasten diffusion of the sulphur fumes. Pipe casings should be opened up and from one end of the vessel to the other there should be a certain number of limber boards removed so as to permit of penetration of the gas into the bilges. Any planked-over space between the outer and the inner sheathing of a vessel should also be freely opened, and wherever there is dead space it should be opened up so that there will be free circulation of the gas. Careful attention should be given to lifeboats, which are often infested by rats which resort to these places for water. Preferably, lifeboats should be cleaned and flooded by water prior to fumigation. Very close attention should be given to the poop deck, which is a space frequently containing a heterogeneous collection of litter and is generally badly rat infested. In general, the engine room and fireroom do not harbor rats, but in the treatment of a vessel infested with plague-infected rats they should be fumigated.

## DISINFECTING PLANTS.

The following-named quarantine stations of the United States Public Health Service are prepared to perform disinfection and fumigation when called upon. At some of the smaller stations a reasonable length of notice should be given in order that the fumigating materials may be procured. The fact that some of the stations are not provided with wharfage facilities is not an index to the capacity of the stations for performing disinfection:

Station.	Depth of water at dock, feet.	Detention facilities (bar-racks), persons.	Hospital beds.
Boston, Mass.....	15	1, 400	65
Cape Charles, Va. (Craney Island).....	10	1, 400	90
Cape Fear, N. C.....	15	46	12
Charleston, S. C.....	22	80	5
Columbia River, Oreg.....	24	0	20
Galveston, Tex.....	25	69	15
Honolulu, Hawaii.....		1, 000	31
Mobile, Ala.....		65	0
New Orleans, La.....	25	200	30
New York, N. Y.....		1, 800	150
Pensacola, Fla.....	22	6	7
Portland, Me.....	7	500	20
Port Townsend, Wash. (Puget Sound, Wash.).....	30	661	26
Providence, R. I.....		100	56
Reedy Island, Del.....	30	400	20
San Diego, Calif.....	22	80	18
San Francisco, Calif.....	19	623	8
San Juan, P. R.....		75	8
Savannah, Ga.....	20	600	7
Subports:			
Marcus Hook, Pa.....		700	90
Delaware Breakwater, Del.....		800	40
Tampa Bay, Fla.....	19	36	8

## GLOSSARY.

**ABDOMEN.**—That part of the body which lies below the chest as far as the pelvis and contains stomach, liver, intestines, etc.; the belly.

**ALBUMINOUS.**—Containing albumin or proteid, i. e., meat, egg, milk, etc., and certain material in bodies of plants and animals.

**ANTIDOTE.**—A medicine given to counteract some action in another or to neutralize the effect of a poison.

- ANTISEPTIC.**—A substance which prevents or retards the growth of organisms, especially of the septic variety, thus hindering putrefaction.
- ASPHYXIA.**—Suspension of respiration and animation; suffocation, as in drowning or from breathing poisonous gases.
- AUTOClave.**—An apparatus for sterilization by steam under pressure.
- BUBONIC.**—Relating in any way to a bubo. B. plague, the most common form of the plague, characterized by the occurrence of buboes in the groin or armpit.
- CAPILLARIES.**—The smallest blood vessels of the body; those which connect veins and arteries.
- CATHARTIC.**—An agent causing active movements of the bowels.
- CATHETER.**—A slender tubular instrument, generally of soft rubber or of silver, used chiefly for passing through urethra into bladder to draw off the urine.
- CAUTERIZE.**—To burn or sear with caustics or a hot iron.
- CLINICAL.**—Relating to the course of the disease. C. thermometer, a self-registering thermometer for taking the bodily temperature.
- CONTAGION.**—The communication of disease from person to person by contact, direct or indirect.
- CORYZA.**—Acute rhinitis; cold in the head.
- DEJECTA.**—The matter passed from the bowel; feces.
- DELIRIUM.**—A temporary mental derangement, occurring in fevers, etc., characterized by incoherent and wandering talk, illusions, etc.
- DISINFECTANT.**—A substance used to destroy the germs of infectious and contagious diseases.
- DISINFECTION.**—The act or process of disinfecting; purification from infecting matter.
- DISLOCATION.**—Where the bones forming a joint do not occupy their usual relation to each other.
- EMETIC.**—An agent which causes vomiting.
- ENDEMIC.**—A disease constantly present in a community, as distinguished from an epidemic.
- ENEMA.**—A fluid injected into the rectum for the purpose of clearing out the bowel or of administering drugs or food.
- EPIDEMIC.**—The extensive prevalence in a community of a disease brought from without or a temporary increase in number of cases of an endemic disease.
- ERUPTION.**—A breaking out, especially the appearance of changes in the skin; a rash.
- FECES.**—The matter discharged from the bowels during defecation.
- FOUNTAIN SYRINGE.**—One which has no pistons, but is hung up and acts by gravity.
- FRACTURE.**—A break, usually in bone.
- FUMIGATION.**—The destruction of germs by means of some disinfecting vapor, as that of sulphur or formaldehyde.
- FUNGUS.**—A Cellular vegetable organism feeding on organic matter; such are mushrooms, yeasts, molds, and bacteria.
- GERM.**—A microbe or pathogenic cell.
- GERMICIDE.**—An agent which is destructive to germs or microbes.
- IMMOBILIZATION.**—The act of rendering a part immovable or of preventing all possibility of movement in a part; especially applied to fractured bones.
- INFECTION.**—Communication of disease, as by entrance of pathogenic germs into an organism in any manner.
- INSECTICIDE.**—An agent which kills insects.
- LAXATIVE.**—A remedy which assists the movement of the bowels which move but sluggishly. A laxative is useless where the bowels have been clogged for several days. (Use cathartic.)

**MACERATION.**—Softening by the action of a liquid.

**MICROBE.**—A microscopic organism, especially a bacterium.

**MICROORGANISM.**—Bacillus, bacterium, microbe, germ.

**PALPITATION.**—Rapid and perceptible beating of the heart, which may be regular or irregular.

**PATHOGENIC.**—Productive of disease.

**PLEURA.**—A thin membrane which covers the inside of the chest wall on both sides, and also covers either lung.

**PNEUMONIC.**—Relating to pneumonia. P. plague, a particularly fatal form, with marked lung involvement.

**PRATIQUE.**—A license or permission granted by the authorities of a port to the master of a vessel, especially after sanitary inspection or quarantine, to hold communication with the shore.

**PROPHYLAXIS.**—The prevention of disease.

**PURGATIVE, PURGE.**—A remedy that moves the bowels actively.

**PURULENT.**—Consisting of pus or matter.

**PUS.**—The matter from a sore.

**PUSTULE.**—A small circumscribed elevation on the skin, containing pus.

**RABIES.**—A disease affecting certain animals, especially dogs, from which hydrophobia is communicated to man.

**RASH.**—An eruption on the skin.

**RECTUM.**—The lowest part of the large intestine opening at the anus.

**SANITATION.**—The employment of measures designed to promote health and prevent disease.

**SEDATIVE.**—A medicine which allays irritation and quiets the nerves.

**SHOCK.**—A condition of collapse or profound prostration sometimes following hemorrhage, injury, anesthetic, and operation.

**SPATULA.**—A broad instrument like a knife with blunt edges for spreading ointments.

**STERILE.**—Free from pathogenic bacteria or other microorganisms; aseptic.

**STIMULANT.**—A medicine having power to excite organic action or to increase the vital activity of an organ, as heart stimulant, respiratory stimulant.

**STRICTURE.**—A narrowing of a passage or canal in the body due to disease or injury.

**SUTURE.**—A stitch used to draw together the lips of a wound.

**TOURNIQUET.**—An instrument for stopping the flow of blood through an artery by means of strong compression.

**TOXIN.**—A poisonous substance of undetermined chemical nature, elaborated during the growth of pathogenic microorganisms.

**URETHRA.**—The canal by which the urine is conducted from the bladder and discharged.

**URINATION.**—The act of discharging the contents of the bladder.

**UVULA.**—The small, fleshy body which hangs from the soft palate over the root of the tongue.

**VARICOSE.**—Having an unnatural enlargement or dilation, knotty and irregular in shape, as often seen in the veins of the lower extremities.

**VENEREAL.**—Pertaining to sexual intercourse or caused by it.

**VIRUS.**—Contagious poisonous matter, as of smallpox or hydrophobia.

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